DRAGON USER

The independent Dragon magazine

November 1986

Contents

Editorial

THERE have been a lot of shakedowns since DU went subscription only in July, and some of them are still shaking. Our special apologies to readers on the tail end of the mailing list, who recieved their September issues soon after their October ones...

But we have our extra four pages at last, and enough Dragon suppliers have come forward with support this month to put a bit of heart back into our advertising pages. We hope this is how it will go on, although there are bound to be ups and downs.

The news that Wintersoft have finally given up hope of producing a follow up to Juxtaposition is not so heartening, showing as it does just another symptom of the decline in the prosperity of the Dragon world. We wish Wintersoft all the best in their new careers, and Microdeal further success with their new acquisition.

Roll on the Christmas 6809 Show on November 22nd. It's a good excuse to visit the smoke and start the Christmas shopping early, as well. Two benefits for the price of one. Don't miss it.

Telephone number
(All departments)
437-4343

Editor
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How to submit articles

The quality of the material we can publish in *Dragon User* each month will, to a very great extent depend on the quality of the discoveries that you can make with your Dragon. The Dragon computer was launched on to the market with a powerful version of Basic, but with very poor documentation.

Articles which are submitted to *Dragon User* for publication should not be more than 3000 words long. All submissions should be typed. Please leave wide margins and a double space between each line. Programs should, whenever possible, be computer printed on plain white paper and be accompanied by a tape of the program.

We cannot guarantee to return every submitted article or program, so please keep a copy. If you want to have your program returned you must include a stamped addressed envelope.

Letters

This is the chance to air your views — send your tips, compliments and complaints to Letters Page, *Dragon User*, 12-13 Little Newport Street, London WC2H 7PP.

Command cure

AFTER entering and running the Core Wars program I found I had trouble with the SUB command not working properly. I found that this fault could be cured by altering line 50 in the Basic progam to:

50 PCLEAR8: POKE 27587, &HE7

I hope this helps other readers.

G. Moulton
15 Beaufort Road
Cottesmore
Oakham
Leics LE15 7AD

Adventure advice

WE HOPE you have enjoyed using Adventure Writer, and are well on the way to writing your adventures. If you wish to market them you are welcome to do so — all we ask is that you mention our Adventure Writer as being used to produce it.

A couple of points have been drawn to our attention.

1) Apparently, some tapes had the two files following EGRUN in the wrong order. If you had one of these, accept our apologies. To correct the fault, just swap the two CLOADM lines in EGRUN after loading. If you still have difficulties, return the tape to us and we will replace it, and your postage.

2)In the Technical Reference Manual, page 5, 'Editor Syntax', the term 'disp' has apparently confused some people. It means 'displacement' from the command label it refers to.

3) Compatible Screen Drivers: Rainbow Writer, by Microdeal, is known to be compatible with Adventure Writer, but it has been reported by a user in Northern Ireland that Rainbow Writer is not compatible with DOS. An alternative screen driver which the author believes should be compatible with both Adventure Writer, and with DOS, is available from Mathew Lodge of Maen Melin, Holmes Chapel Road, Lach Dennis, Northwich, Cheshire CW9 7SZ.

Malcolm Cowen
Cowen Software
23 Bristol Avenue
Levenshulme, Manchester
M19 3NU

Quirks in quiz

THERE were three mistakes in the Counties Quiz program in DU's September edition.

1) Line 630 should read PLAY "L4T2502B"

2) A line needs to be added: 995 QU$=""

3) Also line 3090 was missed. For clarity, it was: 3090 PUT(X,Y)-(T,U),TH,OR:RETURN

This does not apply to anybody who bought the game from me, which is still available at £2.00 from my address.

Justin Hewitt
"Croft Soft"
25 Hammonds Croft
Church Meadow
Hixon, Staffs
ST18 0PQ

Disc notes

I HAVE been a regular reader of DU for the past three years and I really appreciate the effort you put into the magazine. Having recently bought a Cumana disc drive, I would like to hear from other users of this drive with a view to swapping notes on software — especially how to convert existing cassette programs to disc (I've already converted some).

I have not yet seen any adventures available on disc, so being an adventure freak, if anyone can "GET ADVENTURE" and "SEND ADDLESTONE" they will be suitably rewarded.

Finally, if anyone knows the cheat pokes for Downland, please send them to me — it may help to prevent a domestic crisis!

John Blatch
8 Bourneside Road
Addlestone, Surrey
KT15 2HZ

Swapping with Spain

I WANT TO communicate with users or groups of the Dragon computer to swap programs, ideas, magazines, etc. I own many programs although I expect to get more. I want to swap programs for copies of Dragon User from July onwards. Anyone interested, please write to me at the address below.

Juan Carlos Hernandez Heras
C/Jenard Oraa 32 5izq
Santurce
Vizcaya
Spain

Printers needed

JUST RECENTLY I bought an Amstrad word processor, which works well, although it's frustrating to be without the excellent Dragon graphics commands.

What I want to do is use some of the Dragon programs I wrote (in Basic, on cassette) on the Amstrad, so what I need is a printer to print them out, so that I can type them out from hard copy into the PCW. There lies the problem - not one Dragon user in my area has a printer.

I'm appealing to your readers to write to me if they would LLIST my progs for me once I've sent them to them. I'll pay the going rate, of course.

Please help me if you can, otherwise I'll have to BOOT my ASCII, which is very painful!

Tim Jenkins
LLys Helyg
Newport
Pembrokeshire
SA42 0QZ

Extra graphics

DUE TO some bad typing I have discovered something very interesting. The dragon has four extra graphics pages. These pages are hidden and can not be used for drawing, but they can be used with PCOPY command. The new pages are number 17 to 20 and are very useful for backup purposes.

```
10 'PROG SHOWING USE OF GRAPHICS PAGES
20 PCLEAR8
30 PMODE3,1:SCREEN1, O:PCLS
35 CIRCLE(128,96),70
40 PAINT(128,96)
45 FOR T=1TO 4:PCOPY T TO T+16:Nextt
50 PCLS
55 LINE (50,50)-(200,140), PSET, BF
60 FOR T=1 TO4:PCOPY T TO T+4:NEXTT
65 PCLS
70 CIRCLE(128,96),70,2
80 EXEC41194'WAIT FOR KEY
90 FOR T=1 TO 4:PCOPYT+ 6 to T:NEXT 95 EXEC41194
100 FOR T=1 TO 4:PCOPY T+4 TO T:NEXT
105 GOTO105
```

Please note that this will not work on the D64, and also I have not the faintest why this works. Also don't use numbers from 9 to 16 or you will lose your program.

Paul Simpson
11 Hoof Close
Littleport, Cambs
CB6 1HU

Improved display

IN RESPONSE to several letters complaining about the poor quality display outputs from their computers, I have discovered a quick and effective way of improving the quality of the display.

A small internal board modification is required, which is simple and takes about thirty minutes. I would add that I have thus modified both my machines and have been working happily during the twelve months since the work was carried out. The modification works on TV or monitor, and although the enhanced display is monochromatic, the normal wobbly colour display can be restored at the flick of a switch.

Details of the modification are available from me for the nominal price of £1.00.

R. C. Crookes
15 Macaulay Street, Grimsby
DN31 2DS

Dragon User People's Chart

FIRST of all, confessions time. So many of the September edition went out late this month that we have only half the number of Chart returns that we would normally expect. Don't worry if you sent your return quite recently — late Chart Eight returns will be taken into account along with Chart Nine, and tiebreakers will be in the running for next month's prize package. This month's tiebreaker had it in the bag anyway, we think you'll agree, so nobody is going to miss out.

Juxtaposition has given way to a megapopular rival, Shock Trooper — and there are bound to be some more shake ups with Christmas coming on and a small (as ever) but, we hope, good batch of new releases on the way in time for the festivities. We look forward (as they say) to seeing some of them in the chart.

And still we haven't had a winning tiebreaker using that elusive X. Someone must take up the challenge. Not Mr. Darran Collins of Jersey, although he manages to include nearly everything else ... 'The Expert is a psychopathic lunatic, he is insane with hebephrenia, catonia, hallucinatory insanity, paranoia, but I think he's brill'. You forgot verbosity, Mr. Collins, but the £25-worth of Microdeal software is yours.

You wanna winna da games, you send in your five favourite Dragon software packages (games, utilities, what da heck?) AND THEN write a sentence with all or any of the letters from your own top three.

Results October 1986

1 Shocktrooper . . . . (Microdeal)
2 Juxtaposition . . . . (Wintersoft)
3 Shaolin Master . . . . (Quickbeam)
4 Vortex Factor . . . . (Microdeal)
5 Jet Set Willy . . . . (Software Projects)

Chart Nine

Voting for Chart No. 8 closes at 1pm on Friday, 14th November 1986. Entries recieved after that time will not be eligible for inclusion in that month's voting. The editor's decision is final. Only one entry per individual per month will be allowed.

My top 5: Voting Month 7

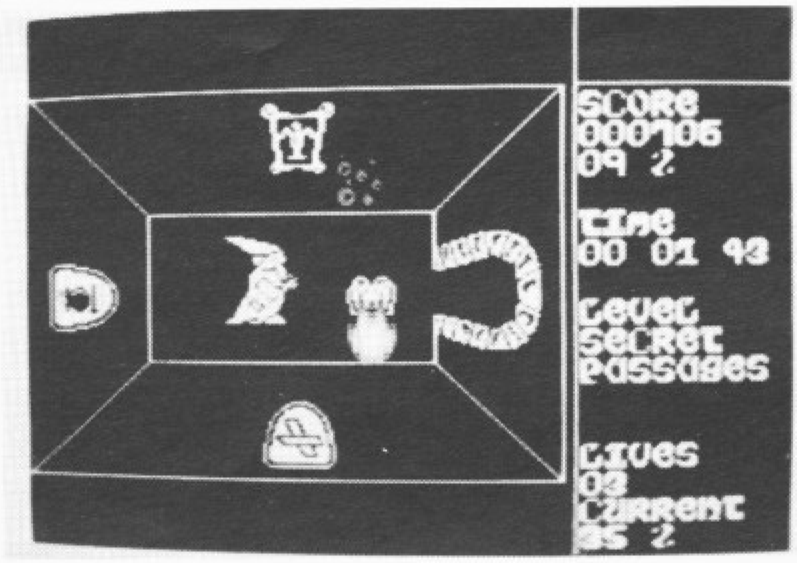
1 . . . .
2 . . . .
3 . . . .
4 . . . .
5 . . . .

Name . . . .
Address . . . .
. . . .
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. . . .

My phrase is: . . . .

News desk

If you have any new products for the Dragon — software or hardware — ring the News Desk on 01-437 4343



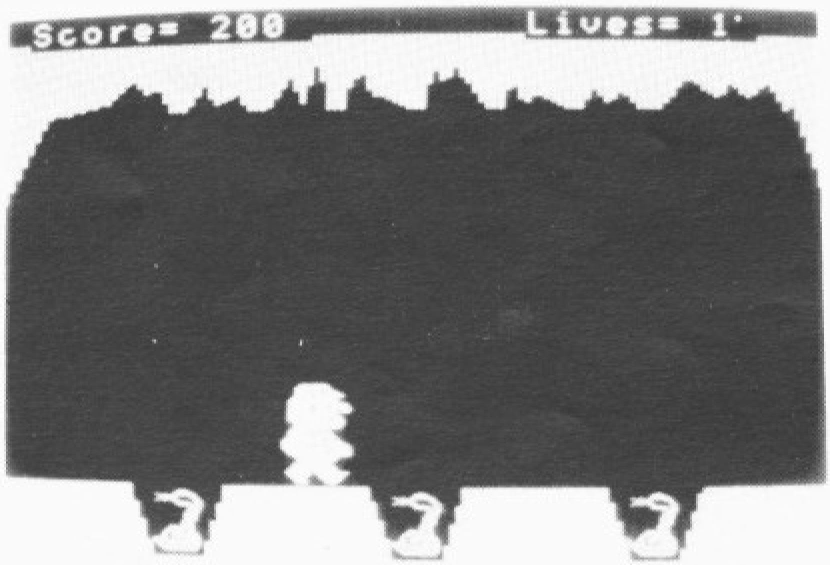
Wizard's Quest

Microdeal in games takeover

AT THE same time as Microdeal defy the trend towards fewer games releases by producing three new games for the Dragon comes the shock news that they have taken over Wintersoft, whose adventure *Juxtaposition — The Barons of Ceti V* is arguably the most popular Dragon game of the last year.

Says Jenny Pope of Microdeal 'We were trying to get hold of them to buy their products from them all this year. Eventually we managed to get hold of them and ended up with a deal to buy out all their rights worldwide.'

The projected follow-up to *Juxtaposition* (originally planned as a trilogy, a dubious habit acquired from the fantasy book trade) will now not be developed, continuing the trend against new games development as professional programmers are forced out of the Dragon market. The inability of software houses to sell enough games packages to support good full time programmers to produce new games has also killed off Incentive's partly-written *Time Lord* when the game's writer was compelled by necessity to get a regular job.



Cuthbert and the Golden Chalice

The three new programs from Microdeal are *Wizard's Quest*, where the player collects treasures in a haunted mansion, *Cuthbert and the Golden Chalice*, the latest in the Cuthbert series, with twenty screens, and *Tanglewood*, their piece de resistance, with 700 locations, five controllable characters and a 3D maze. Cuthbert and Wizard's Quest are reviewed in this issue Dragon User.

Utility on cassette

PAMMCOMMS tell us that, after developing their *Sourcemaker* disc utility to cover non-disc Dreams, the whole system has been rationalised onto a single cassette version which covers all versions of Dragon-DREAM, and the disc version withdrawn. Dragon User will be reviewing this version soon.

Pam D'Arcy is now working on WINDOWSCREEN - which she 'envisages as the start of a Fleet Street Editor/Pagemaker system as available on the BBC'. We have no release date for this package as yet.

FLEX for the PC

FOR serious 6809 fanatics, Compusense have developed their PI-6809 microprocessor development compatible computers (which do not include the Dragon, unfortunately), "PI-6809 makes a PC compatible into a FLEX-based 6809 development workstation while retaining all the facilities of the PC computer' say Compusense.

The system costs £495 ex. VAT and delivery. For information or demonstrations contact Compusense on 01-882 0681.

Micro group

FURTHER to the subject of the 6809 microprocessor, the 68 Micro Group can be contacted via Joe Johnson at 21 Edwalton Ave., Peterborough, Cambs. Mr Johnson is the periodical bulletin. Regular meetings are held in central London, and there seems to be some movement in the Midlands as well.

Catalogue competition

FOR hardware designers and redesigners, the Winter 1986 catalogue from Cirkit Distribution, the electronic components people, will be available on the news stands or from Cirkit ofter 16th October, priced £1.20. Special attraction in this edition is a competition to win a £327 Hamet 20MHz oscilloscope, with other electronics prizes for the runners up.

For information or to order, contact Cirkit at Park Lane, Broxbourne, Herts EN10 7NQ.

Hewson recruits

HEWSON computer games are looking for new freelance software writers.

"You must have the experience to estimate time and memory requirements with reasonable accuracy and the determination and skill to work to the realistic timetable' states Hewson's press release. The company will provide technical and business support to talented programmers in developing commercial games in return for a professional level of ability and commitment.

Hewson are at Hewson House, 56b Milton Trading Estate, Milton, Abingdon, Oxon OX14 4RX.

Christmas 6809 show

MICRODEAL'S 6809 Christmas Show takes place on November 22nd at the Royal Horticultural Hall in Westminster, London.The National Dragon Users Group and the TRS 80 Users Group will be there, as well as trade exhibitors.

Visitors are advised that parking in the Victoria area, although not as bad as central London, can be a trying experience. For those who choose to park further out and come in on the Underground system, or by British Rail, the nearest stations are Victoria (main line) or Victoria or St. James' Park (underground), all of which are about ten minutes walk from the Horticultural Halls in Vincent Square.

Further information from Microdeal on 01 726 6820.

Communication

Send in your questions, requests, and pleas to Communication, Dragon User, 12-13 Little Newport Street, London WC2.

Problem: Has anyone out there got a copy of 'Elite* Calc' along with the appropriate instuctions which they can pass on to me? What I really require is a powerful spreadsheet program which does not run under OS-9.
Enquirer: D. Lees, 9 Elmtree Way, Bristol BS15.

Problem I have built Andtek Data Design's Addbuss and would be interested to know if anyone out there has also built it, as I have been unable to get it to work properly under software control. If anybody has got it to work please contact me.
Enquirer: John Margrave, 24 Canon Young Road, Whitnash, Leamington Spa, Warwickshire CV31 2QU.

Problem: I own a Dragon 32 and I am looking for a detailed memory map. I only own the short one from the 'additional information' section of the manual. I am particularly interested in the addresses of the different functions of the Basic and in the addresses from FF00 to FFFF*. Could anyone write to me with this information or tell me how to find it?

I am also looking for a Dragon user in my area, that is Belgium, area code 4xxx. If you know one (or are one) please get in touch.
Enquirer: P. Gehrenbeck, 1 rue Curie, B-4100 Seraing, Belgium.

Problem: I have been exploring the Microsoft Extended Basic and the DragonDOS-ROM for some time to find out how the machine code works. I have used the Grosvenor DSKDREAM package. To disassemble all this code is a very tiresome operation, so I wonder if anyone knows where I can get a copy of the original assembly source code listing for these ROMs?
Enquirer: Olav Havard Noraberg, Gravshaugvn, N-3840 Seljord, Norway.

Problem: I have been trying to write a routine to autorepeat the keys on my Dragon 32. The listing below is my best effort, but it repeats too fast. If I put in a delay, it slows the computer down drastically. Can anyone help? Also, is there a machine code routine to get the text or graphics screen upside down?

```
LDX£START
STX $10D
RTS
START LDX £$150
LOOP LDD£$FFFF
STD,X+
CMPX £$15A
BNE LOOP
JMP $9D3D
```

Enquirer: Philip Callaghan, 54 Penkvale Road, Moss Pit, Stafford ST17 9EY.

Problem: On the Microdeal word processor, how can I define the user definable codes?
Enquirer: Daniel Lawrance, 26 Lea street, Lindley, Huddersfield, West Yorks HD3 3LS.

Communication

Stuck for a routine? Need some obscure equipment? Feeling cut off? Fear not — someone, somewhere can help you! Write down your problem on the coupon below (make it as brief and legible as possible) together with your name and address and send it to Communication, Dragon User, 12/13 Little Newport Street, London WC2H 7PP. We'll publish it as soon as we can — meanwhile, maybe there's someone you can help this month!

Problem ....
....
....
Name ....
Address ....
....

New software for review should be sent to *Dragon User*, 12-13 Little Newport Street, London WC2H 7PP.

Don't dream of being without it!

Program: *Sourcemaker*
Requires: Any Dream or Alldream assembler
Supplier: Pamcomms Ltd., 21 Wycombe Lane, Wooburn Green, High Wycombe, Bucks.
Price: £9 inclusive, UK; £10 inclusive overseas.

Sourcemaker from Pamcomms Ltd. is based on such an obvious idea that I'm amazed nobody has thought of it before. Used in conjunction with Grosvenor's Dream range of assemblers it will disassemble machine code from ROM or RAM and produce output in a format suitable for loading into Dream.

The tape contains the control program Poker and several different versions of *Sourcemaker* to cover all configurations of the assembler — these are Alldream cartridge, Alldream tape, Dream tape, Dream/Dreambug tape, Dskdream and a version for owners of DeltaDOS systems. Instructions are included for transferring the software to disc (any DOS).

Operation is simplicity itself: the Dream assembler is first loaded (or plugged in) as normal, then the POKER Basic program loaded, followed by the *Sourcemaker* machine code program. This is written in relocatable machine code and so can be loaded anywhere in RAM — its default position is at 3072 in the graphics area.

Running the program produces options to change the default CLEAR setting (usually set at 12001 by the user) and the Dream text table limit. The start address of the code to be converted is then entered and *Sourcemaker* gets to work. Conversion is carried out at a very high speed and a visual indication of what is going on is given on screen. The pseudo-source code output is stored directly into Dream's text table until it is full. To get to the pseudo-source code, Dream is then entered as usual (EXEC) and Old Text selected.

The source code is as near as possible to the original source code but data will be interpreted as instructions, *Sourcemaker* obviously cannot determine where the original FCBs etc. were. This makes no difference to the validity of the code — BREAK-A will assemble the code producing exactly the same machine code as was disassembled.

Unlike some systems which use pseudo labels (eg L5FFF for a label at $5FFF) *Sourcemaker* uses the program counter and offset for all branches etc, producing source such as BRA *+10. Comment lines are included in the code, showing for example the ASCII character referred to in a load instruction such as LDA £42 ;'*'

The program intelligently tries to decide when it is better to output FCBs rather than a 6809 mnemonic to ensure that the assembled code will be exactly the same (byte for byte) as that disassembled. This overcomes the potential problem of Dream's use of 'Zero Register Offset'.

There must be countless uses of this program from modifying Basic on the Dragon 64 to changing commercial tape software to run on disc. If I had to make one criticism it is that code is disassembled until Dream's text table is full. This means that you have to enter Dream, mark and delete the code following that which you actually wanted to disassemble. This is simple enough, but it would have been nice to be able to specify the end address of the code to be converted.

Sourcemaker compliments the Dream package superbly and no Dream owner should be without it.

Brian Cadge

Items for collection

Program: *Wizard's Quest*
Supplier: Microdeal
Price: £5.95

I SUPPOSE I've nothing to cry about. It's just another hard luck story from a town with no cheer. Her name was Elanore, with an 'e' at both ends, one for entrance and one for exit.

She wasn't good looking, a rather plump girl, with spiky hair and a fascination with egg-laying mammals but, for a while, she was mine. I remember how we met at a computer fair in London. Momma always said not to get mixed up with city girls. I was playing Atic Atac and she came up to me and said she knew of a different place where we could play a more stimulating game.

I followed her to a back street and up a long, dim flight of stairs. Her flat was on the third floor, she said, and she was sharing with a room mate who was on an AA demo in Trafalgar Square most of the time. She led me to the bedroom, to her favourite toy — a Dragon. (*Jason spends all his time doing this sort of thing - Ed.*) The screen said 'Wizard's Quest' and 'Press any key'.

'I'll just get the stuff' she said, and came back with a joystick. She broke me in gently, letting me flit smoothly from screen to screen on this game which seemed so familiar, so like the one I had been playing when we met. She coaxed me, teasing me, letting me fall down the holes 'til I'd learned to avoid them. Then, just when I thought it was easy, she took me to The Room, where all the objects were listed that I had to collect, with no hints on how to find them, or how to recognise them (the graphics were pretty bad).

Well, to cut a long story short, she lied to me, that girl, she said she loved me but she always randomised the positions before my go. I still see her occasionally, when I can raise the money, when I can afford a fix of Wizard's Quest.

Jason Orbaum

Watch your step

Program: *Cuthbert and the Golden Chalice*
Supplier: Microdeal
Price: £5.95

THIS game would be better titled 'Mario and the Golden Chalice' as the graphic hero looks very much like an expanded Mario from *The King*.

The game runs in PMODE4 and is closest to *Eddie Steady Go* among Dragon games. The idea is simply to go from left to right across the screen avoiding various obstacles thrown in your way by the computer, in your quest for the golden chalice.

The game has twenty screens of which I appear to have completed about eight for, although according to the instructions once a pattern is worked out for a screen that screen can easily be repeated ad infinitum, the reality is that once a screen is completed it's quite likely to be cocked up quite dramatically on every other attempt! At least, that was the case with me. However, the game is addictive, and if I didn't have to keep stopping to write reviews I could quite happily have played it all night.

I can't really rave about it because it's very simple and I can imagine it getting boring. However, don't let that put you off, because it's a good game and well written, and Microdeal mentioned at the PCW show recently that they're not sure if they'll be supporting the Dragon this time next year, so make the most of this game from a company who have, at last, stopped putting out any rubbishy games!

The graphics are very smooth (except for the figure who flickers a bit — surely something could have been done about this), and the sound is unobtrusive and really rather pleasant. A good game, even if a fairly simple one.

Jason Orbaum

◆ ◆ ◆ ◆ SPECIAL OFFER ◆ ◆ ◆ ◆

QUICKBEAM SOFTWARE

FIRE FORCE

- *Unusually large sprites*
- *Hi Res colour graphics*
- *Four channel musical soundtrack by Chris Jolly*
- *Joystick operation*

£1 off!

● Quickbeam Software's hit game Shaolin Master proved a winner with Dragon users. Now Quickbeam and Dragon User are getting together to offer Quickbeam's new game, FIRE FORCE — at a pound off the retail price. The offer is open to Dragon User subscribers only, until 21st November — so hurry.

● FIRE FORCE is Quickbeam's follow-up to the successful Shaolin Master. It has taken three programmers six months to develop the two-stage arcade game, which has up to nine moving sprites on screen at a time. The game opens with you, the leader of the commando Fire Force, faced with squads of enemy troops as you dodge your foes, trees ad gateways to search for the prototype MFTC X18 SPIRIT low level attack plane which has been hi-jacked and forced down in a clearing deep in the African forests. If you can reach the plane alive, the second challenge begins: to fly the machine to safety, avoiding obstacles and the enemy's planes, collecting energy packs as you go by swooping close to the ground.

● The manoeuverable X18 Spirit appears on screen as a large, detailed sprite, but the enemy strike force are larger and more formidable still, though less nimble. To avoid the planes, and collect the energy packs, you must use the Spirit's low flying capability to the full, but beware of trees, buildings and other perils as you skim the ground.



Your only guide is an altimeter at the left of the screen — you will need all your concentration to survive, while knocking out the enemy and collecting your bonuses.

● The special offer is by post only to Dragon User, and closes on 21st November. Applications arriving after that date will not be eligible, so fill in the form on this page (or make a copy of it) and send it, together with your cheque or postal order for £8.95 to Quickbeam Offer, Dragon User, 12/13 Little Newport Street, London WC2H 7PP, making your cheques payable to Scot Press Ltd.

Please send me . . . . copies of FIRE FORCE at the special offer price of £8.95 each. I enclose my total payment of . . . . . payable to Scot Press Ltd.

Name...

Address...

....

.... Postcode ....

Please allow 28 days for delivery. Offer closes 21st Nobember 1986.

DR24

Using discs

***D Rothery** shares his inside knowledge of discs and DOS*

AS THE prices of both drives and discs come down, more people are enjoying the great increase in convenience and flexibility of using them with the Dragon, and at the same time many are cursing the manuals for lack of information. I shall try to tell you what I wish I had known when I started with discs, and also will show you how to use this knowledge by giving you a demonstration utility program which I think you will find useful.

With the demise of Premier microsystems, Cumana seem to have cornered the market with their controller cartridge and drives — and both are very nicely produced. Cumana call them 'DragonDOS compatible', but seem coy about telling you exactly what this means. In fact all the DragonDOS commands work on the Cumana system, so all Basic disc programs should work. Cumana has some extra commands, namely SCOPY which allows you to copy any files including data files to another disc using only one drive (use DragonDOS COPY and you end up with two files on one disc), and COPY'@:filespec' which will copy from tape to disc or disc to tape. As you can see these are very useful. Also the PROTECT ON command which protects files can be abbreviated to PROTECT. (Don't use this in programs since if you later try to run this on DragonDOS you will get an SN error.)

There are penalties, however. Cumana is very fussy about filenames — not only will it not accept lower case or symbols such as '-', but you cannot start the filename with a number. It is also lazy about reading things like directories. Having read the directory track once it uses this information stored in memory next time you read the directory in your program — not very useful when you have inserted a different disc! Also there is no backup directory track (but see later). More serious is the fact that several machine code programs do not work with Cumana, among them the 64K versions of Edit+, Rainbow writer and Quickbeam's Duplidisk.

The solution is to obtain the latest DragonDOS ROM version 4.0 from Compusense. This has been produced for Eurohard's disk system and seems to have got rid of all known bugs as well as featuring an autoboot system and paging the directory (not a bit of improvement since it is still too fast). The ROM is not expensive and can simply be replaced for the Cumana ROM after removing four screws in the Cumana controller. Be careful to put the ROM in the same way round as the original. If you are in doubt I am sure Compusense would do it for you if you returned to unit to them. However (sigh!) you lose the extra commands.

Most beginners have problems with FREAD and FWRITE since they forget that, unlike tape files, it is imperative to print separators between each item when writing the file to disk.

Thus: FWRITEF$;A;",";B where F$ is the file and A,B the variables. Also if you write to the same file twice it adds the second lot of information to the end. So if you want to update a file rather than add to it remember to KILL it first or you will wonder why you get the old lot of information when you read it back. (Microdeal forgot this with their Filemaster filing system.) Remember that if you want to save text with commas already in you can use FLREAD instead of FREAD. This will read all strings up to a new line mark into one variable. Thus FWRITEF$; A$:FWRITEF$; B$ will be read in as two separate strings by FLREADF$;A$,B$.

Also, don't forget that anything which can be done with the PRINT statement can be done also by FWRITE, so that FWRITEF$;USING "# # #.# #";X is perfectly legal, and can be useful if you want to keep files all the same length, for random access.

Filename extension

All filenames have an extension, so if you do not specify one the DOS will automatically place '.BAS' after a Basic program name and '.BIN' after a machine code file. However, the DOS does not need this extension to identify the type of file, so you are at liberty to use any letters you want. Thus when I was writing a program to save schoolpupils' name lists to disc and then to save the same name lists with the marks they obtained in a test, I saved the names as 'FILENAME.NAM' and the marklist as 'FILENAME.MAR'. Then I have a routine which collects all the marks for the year and puts them on a spreadsheet. It loads all files ending in '.MAR' automatically, putting them in an array, and ignores those with '.NAM'. As another example, you can save any graphics screen to be used later in, say, an adventure program by first drawing the graphics required then using 'SAVE"FILENAME.HRG",3072,4607,3072'. If more than one graphics page is in use then alter the 4607 accordingly. The '.HRG' will then remind you what this file does.

The disc utilities and disc detective in the August 1985 issue of Dragon User are so good that I would recommend all disc users to send for a photocopy (*£1 — Editor*). However, Pam D'Arcy's doctor is only really useful if you know where to find your programs on the disc. It is all right being able to read and display — even alter — each track and sector, but the Dragon does not always save the files as one continuous unit. They may be scattered in several sections. My program should help in this and also adds several other new utilities. I hope also it will demonstrate techniques you can use in other programs.

First however we must understand the directory track. This starts on track 20, sector 3. (Tracks are numbered from 0 onwards and each is divided into 18 sectors, starting at number 1.) Each sector holds 256 bytes of information which can be accessed by typing CLEAR500:SREAD1,20,S,A$,B$ where S is the sector number. The variable A$ will now contain the first 128 characters in the sector, and B$ the remaining 128 characters. If you do this for sector 3 and then type PRINTA$ you will no doubt recognise some filenames from your disc. However you will also see some peculiar symbols and if you count up there will be less than 128 characters displayed. This is because some parts of the directory are pure numbers, and the CHR$ equivalents which are in A$ either do not print letters or don't print at all. Indeed, if the number 13 is present anywhere your display will have skipped to a new line, since CHR$(13) is the instruction to the screen printing routine of the computer to do this.

If we now type: FOR X = 1 to 25:PRINT ASC(MID$(A$,X,1));",";:NEXT we will see a string of 25 numbers which represent the information stored for the first file on the disk. The first number is a 'flag'. This will usually be 0, but will be 2 if the file is protected, 129 if killed (128 in CumanaDOS), 137 if there are no more entries following. The next eight numbers are the ASCII equivalents of the filename. Note that if the filename is less than eight characters zeroes are used as entries. These do NOT print as spaces, since the ASCII for space is 32. This must be allowed for in your programs — one method is shown in lines 8020-8050 of my program. The next three numbers give the filename extension in a similar way.

The three numbers which follow refer to where the first block of the file is stored on the disc. The first two (call them A & B) give the 'logical sector number'. This is the total number of sectors, ignoring the start of new tracks, counting from 0 at the beginning of track 0. Thus the LSN 19 is really track 1, sector 2. Get it? To find the LSN we calculate A*256+B. Hex users will understand why. The remaining number is the number of sectors the block takes. If the program is long enough the next chunk will be stored as shown by the next three numbers, and so on. (A block length of 0 shows there are no more blocks.) The twenty fifth number shows how many BYTES are used in the final sector, which may of course be only partially filled. This is needed to calculate the length of the program. In rare cases a file may take two directory entries if it is very long, but we are going to ignore this.

Since each directory sector has 256 bytes, this allows ten entries with six unused bytes. I have used the last six bytes of the first and second sectors to give the facility to store a disc title of up to 12 letters. This is accessed at the beginning of my program

(lines 220-280) and printed at the head of the printouts. Every time you change discs, use option 3 of the menu to check the title and enter one if necessary.

Menu option 2 gives each twenty five byte directory entry in columns. The part which gives the filename is in letters, the rest in hex numbers. (If you want to convert to decimal, type PRINT&HX where X is the hex number.) A summary of the meaning of the entries is also printed. I have used condensed font to print more characters per line — adjust the printer codes where shown if your printer is different to mine. Lines 2070-2240 read each directory sector and print it in the required format.

Option 1 gives the same information in a more convenient form. Line 6040 splits each directory entry into the name, NA$, the extension, EX$, the flag, F, and an array FA(1) to FA(13). Line 6050 calculates the track and sector numbers for each storage block. The subroutine starting at 7000 now actually reads the first part of the file from the disc. The file header obtained gives the following information: first number = 55 except for data files, which have no header; second gives type (1=BAS 2=BIN); third and fourth give start address of binary files; fifth and sixth give length; seventh and eighth give exec address of binary files. For each pair of numbers use 256*A+B to calculate the address as before. Thus the final printout gives all this information, as well as if the file is killed or protected.

The protection subroutine option 4 checks each entry and protects it, providing it is not a data file (since you may wish to write to those). Removing line 8010 will protect data files as well. Thus, a whole disc may be protected at one command, or the protection removed. If you have just killed a file by mistake, then providing you have not saved one on top of it then option 6 which calls lines 9000-9030 changes the flag back to a legal file entry.

DragonDOS automatically backs up the directory on track 16. If you accidentally corrupt your directory, lines 4000-4010 will replace it with the backup track. DO NOT include this facility in your program if you have CumanaDOS — you will copy a blank track and lose all your programs! It would be simple to reverse the given routine, however, and give yourself the peace of mind of a track 16 by copying track 20 to track 16.

The error trap routine provided may also be useful for other programs, since it gives a letter code for the error before returning you to the menu. Normally, if you use ERR you get an error number which has to be looked up. Line 170 checks automatically that your printer is connected properly — always better than asking the user to confirm that the printer is switched on. A similar test for the disc drive is:

IF PEEK(&HC000)=68 THEN 'action'

where 'action' might be loading in a file from disc, etc. Thus a program could load from either disc or tape, automatically sensing which to use.

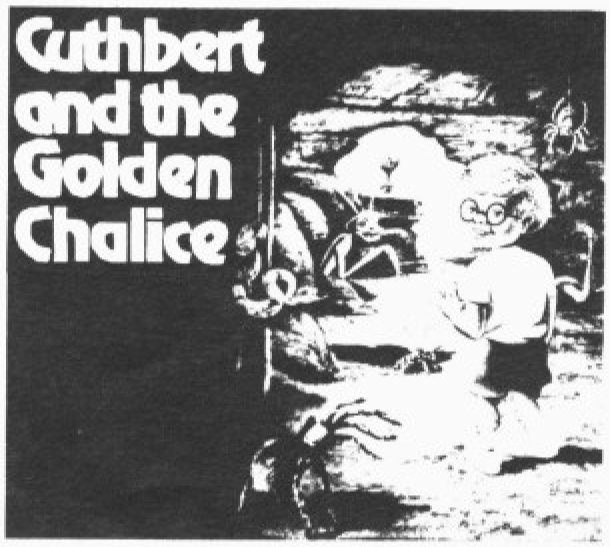
I am sure that you will be able to think of other ways of using the directory, eg to load all files with a certain extension, or load all files starting with a certain letter. 'Wild card' searching is quite easy to arrange. Also you might write a program to give a name to a file you have inadvertantly saved without one. Have fun. But one final word of warning — don't try any program using SWRITE on a disc unless you have a backup copy. A small mistake in the program could lose everything!

```
1 REM COPYRIGHT (C) D. W. ROTHERY 1985   * DISK UTIL *
5 ERROR GOTO 10000
10 CLEAR3000:DIMFA(13):FT$(0)="BAS":FT$(2)="DAT":FT$(1)="ML "
20 CLS:PRINT@3,"*** DISK FILE UTILITY ***"
30 PRINT@72,"BY DAVID ROTHERY"
40 K$=INKEY$
50 PRINT@480,"INSTRUCTIONS (Y/N)?";
60 K$=INKEY$:IFK$=""THEN60
70 IFK$="N"THENGOSUB170:GOTO300ELSEIFK$<>"Y"THEN20
80 CLS:PRINT"THIS PROGRAM WILL ALLOW YOU TO  PRODUCE A PRINTED COPY OF MOST  OF THE USEFUL DISK FILE DATA FOREITHER A SINGLE-SIDED DRIVE
 OR  ONE OR TWO DOUBLE-SIDED DRIVES. IT ALSO USES A BACKUP DIRECTORY TO REPAIR A CORRUPTED ONE.      ";
90 PRINT"RESTORES A KILLED FILE & ALLOWS YOU TO PUT A TITLE ON YOUR DISC.THE PROTECTION FACILITY ALLOWS  ALL FILES WHICH ARE NOT DATA TO
 BE PROTECTED OR FOR ALL          PROTECTION TO BE REMOVED."
100 PRINT@480,"PRESS ANY KEY";:EXEC41194
110 CLS:PRINT"THE SUPER DIRECTORY GIVES THE   USUAL INFORMATION, PLUS START   LENGTH AND EXEC ADDRESS OF M/C  PROGRAMS. THE NUMBERS FOLL
OWING THIS ARE IN GROUPS OF THREE AND ENABLE YOU TO TRACE WHERE IT IS STORED ON THE DISC. THE FIRST   ";
120 PRINT"GROUP GIVES THE TRACK, SECTOR & LENGTH (IN SECTORS) OF THE FIRSTBLOCK STORED. IF FURTHER BLOCKS HAVE BEEN NECESSARY THESE ARE
  SHOWN IN THE FOLLOWING GROUPS.":PRINT@480,"PRESS A KEY";:EXEC41194
130 CLS:PRINT"THE DIRECTORY EXAMINE PROGRAM   PRINTS THE FULL DIRECTORY ENTRY IN HEX (APART FROM THE FILENAME)AND EXPLAINS EACH ENTRY AT
 THE  END. NOTE THAT LOGICAL SECTORS  ARE COUNTED FROM THE BEGINNING  OF TRACK ONE, CALLING THE FIRST SECTOR ZERO."
140 PRINT@480,"PRESS <ENTER> TO CONTINUE...";:INPUTA$:GOSUB170:GOTO300
150 CLS:PRINT@4,"*** SUPER DIRECTORY ***"
160 '***********************TITLE DISC*******
170 CLS:PRINT:PRINT"      insert desired disk":A=PEEK(65314)AND1:IF A=1THEN PRINT:PRINT"turn printer on or insert paper":K$=INKEY$
180 PRINT:PRINT"DRIVE NUMBER (1-4) ?";
190 K$=INKEY$:IFK$=""THEN190
200 DR=ASC(K$):IFDR<49ORDR>52THEN190
210 DR=DR-48
220 CLS:SREADDR,20,3,X$,Y$:TI$=RIGHT$(Y$,6):SREADDR,20,4,A$,B$:TT$=RIGHT$(B$,6):TI$=TI$+TT$:IFASC(LEFT$(TI$,1))=0THEN250ELSEPRINT"TITLE
OF CURRENT DISK :          "TI$:PRINT"DO YOU WISH TO RENAME (Y/N)":K$=INKEY$
230 K$=INKEY$:IFK$="N"THEN A$="":B$="":X$="":Y$="":RETURN
240 IFK$<>"Y"THEN230ELSE260
250 PRINT"DISC HAS NO TITLE-PLEASE ENTER  ONE"
260 INPUT"DISC TITLE REQUIRED            (1-12 CHARACTERS):             ";TI$
270  IFLEN(TI$)<>12 THEN 280ELSE Y$=LEFT$(Y$,122)+LEFT$(TI$,6):B$=LEFT$(B$,122)+RIGHT$(TI$,6):SWRITEDR,20,3,X$,Y$:SWRITEDR,20,4,A$,B$:SW
RITEDR,16,3,X$,Y$:SWRITEDR,16,4,A$,B$:GOTO220
280 IFLEN(TI$)>12THEN TI$=LEFT$(TI$,12):GOTO270ELSEFOR N=LEN(TI$)+1TO12:TI$=TI$+" ":NEXT:GOTO270
290 '***********************MENU************
```

```
300 CLS:PRINT@3,"*** DISK FILE UTILITY ***"
310 PRINT@110,"MENU"
320 PRINT@160,"1  SUPER DIRECTORY"
330 PRINT"2  DIRECTORY EXAMINE"
340 PRINT"3  INSERT DIFFERENT DISC"
350 PRINT"4  PROTECT ALL PROGRAMS"
360 PRINT"5  RESTORE DAMAGED DIRECTORY    6  RESTORE KILLED FILE"
370 K$=INKEY$:SOUND1,1:LC=0
380 PRINT@490,"YOUR CHOICE ?";
390 K$=INKEY$:IFK$<>""THEN440
400 FORX=1TO100:NEXTX
410 PRINT@490,"your choice";
420 FORX=1TO100:NEXTX
430 GOTO380
440 PRINT@490,"working      ";:ONVAL(K$)GOSUB1000,2000,170,3000,4000,5000
450 GOTO300
460 '**********************PRINT SIDE/TITLE**
470 IFDR<2THENPRINT#-2,TAB(15)"SIDE 1":ELSEPRINT#-2,TAB(15)"SIDE 2";
480 PRINT#-2,TAB(25);
490 PRINT#-2,CHR$(27);CHR$(14);:REM PUT YOUR PRINTER'S CODE HERE TO TURN ON DOUBLE WIDTH PRINTING
500 PRINT#-2,TI$;
510 PRINT#-2,CHR$(27);CHR$(15);:REM PUT YOUR PRINTER'S CODE HERE TO TURN OFF DOUBLE WIDTH PRINTING
520 PRINT#-2:PRINT#-2:PRINT#-2,CHR$(27);CHR$(20);:RETURN
990 '**********************SUPER DIRECTORY***
1000 PRINT#-2,TAB(20)"SUPER DISK DIRECTORY":PRINT#-2:GOSUB470
1010 PRINT#-2,CHR$(27);CHR$(20);"FILENAME/EXT TYP START,LENGTH, EXEC, TRK,SEC,LEN, TRK,SEC,LEN, TRK,SEC,LEN, TRK,SEC,LEN, FLAG"
1020 PRINT#-2,"============ === ===== ======  ====  === === ===  === === ===  === === ===  === === ===  ====":PRINT#-2
1030 FLAG=1:GOSUB6000
1040 PRINT#-2:PRINT#-2,"FREE BYTES = ";FREE DR
1050 PRINT#-2:PRINT#-2,"NUMBER OF PROGRAMS ="LC
1060 NL=52:IFLC>52THENNL=118
1070 FORZ=1TONL-LC:PRINT#-2:NEXTZ:FLAG=0:RETURN
1990 '**********************DIRECTORY EXAMINE*
2000 PRINT#-2,TAB(17)"DIRECTORY - TRACK 20, SECTORS 3-11":PRINT#-2:GOSUB470
2010 PRINT#-2,"ENTRY   00  01  02  03  04  05  06  07  08  09  10  11  12  13  14  15  16  17  18  19  20  21  22  23  24"
2020 PRINT#-2,"=====  ";
2030 FORX=0TO24
2040 PRINT#-2," == ";
2050 NEXTX
2060 PRINT#-2:PRINT#-2
2070 FORX=3TO18
2080 SREADDR,20,X,A$,B$
2090 A$=A$+LEFT$(B$,22)
2100 FORZ=1TO10
2110 ZZ=Z
2120 IFZ>6THENA$= RIGHT$(B$,106):ZZ=Z-6
2130 W=0:A=ASC(MID$(A$,(ZZ-1)*25+1,1)):IFA=137THENZ=10:X=18:GOTO2220
2140 PRINT#-2,Z+(X-3)*10;
2150 IFA=2THENW=1:PRINT#-2,TAB(8)"P ";ELSE IF A=128OR A=127 THENW=1:PRINT#-2,TAB(8)"K ";
2160 FORY=W TO11
2170 PRINT#-2,TAB(Y*4+8);MID$(A$,Y+(ZZ-1)*25+1,1);
2180 NEXTY
2190 FORY=12TO24
2200 PRINT#-2,TAB(Y*4+8);HEX$(ASC(MID$(A$,Y+(ZZ-1)*25+1,1)));
2210 NEXTY
2220 PRINT#-2:LC=LC+1
2230 NEXTZ
2240 NEXTX
2250 PRINT#-2:PRINT#-2,"00 = FLAG P-PROTECTED, K-KILLED":PRINT#-2,"01-08 = FILENAME "
2260 PRINT#-2,"09-11 = EXTENSION"
2270 PRINT#-2,"12-13 = LOGICAL SECTOR OF FIRST FILE BLOCK; 14 = LENGTH IN SECTORS"
2280 PRINT#-2,"15-17 = SAME FOR SECOND BLOCK; 18-20 FOR THIRD; 21-23 FOR FOURTH"
2290 PRINT#-2,"24 = LENGTH IN BYTES OF FINAL SECTOR."
2300 PRINT#-2,"THUS LENGTH OF FILE = (ENTRY[14]+[17]+[20]-1)*256 +[24]"
```

```
2310 PRINT#-2,"FIRST TRACK = ([12-13]+1)/18: SECTOR = REMAINDER."
2320 NL=45:IFLC>45THENNL=111
2330 FORX=1TONL-LC:PRINT#-2:NEXTX:RETURN
2990 '*********************PROTECT ALL FILES*
3000 CLS:PRINT"DO YOU REQUIRE TO PROTECT ALL   PROGRAMS ON DISC (P) OR REMOVE  PROTECTION (R)?"
3010 Z$=INKEY$:IF Z$="P"THEN FLAG = 2 ELSE IF Z$="R"THEN  FLAG=3 ELSE 3010
3020 PRINT@490,"working";
3030 GOSUB6000:FLAG=0:RETURN
3990 *******RESTORE DIRECTORY*********
4000 FOR X=3 TO18:SREADDR,16,X,A$,B$:SWRITEDR,20,X,A$,B$
4010 NEXT:FLAG=0:RETURN
4990 *****RESTORE KILLED FILE********
5000 CLS:PRINT"IT IS IMPORTANT THAT YOU HAVE   NOT SAVED A NEW FILE SINCE      KILLING THE FILE.               PLEASE CONFIRM THAT YOU H
AVE    NOT BY TYPING Y TO CONTINUE OR  N TO ABORT"
5010 Z$=INKEY$:IF Z$=""THEN 5010 ELSE IF Z$<>"Y"THEN RETURN
5020 CLS:INPUT"ENTER FILE NAME (NO EXTENSION   PLEASE)";NB$:IF LEN(NB$)>8 THEN 5020
5030 FLAG=4:GOSUB6000:FLAG=0:RETURN
5990 '*********************SUBROUTINE FOR DIR ENTRY*
6000 FORX=3TO18
6010 SREADDR,20,X,X$,Y$
6020 X$=X$+LEFT$(Y$,122)
6030 FORN=0TO9
6040 NA$=MID$(X$,N*25+2,8):EX$=MID$(X$,N*25+10,3):F=ASC(MID$(X$,N*25+1,1)):FORI=1TO13:FA(I)=ASC(MID$(X$,N*25+12+I,1)):NEXT
6050 FORJ=0 TO 3:TR(J)=INT((FA(3*J+1)*256+FA(3*J+2)+1)/18):SK(J)=FA(3*J+1)*256+FA(3*J+2)+1-18*TR(J):IF FA(3*J+3)=0THEN SK(J)=0
6060 NEXT
6070 IF( ASC(NA$)<33 OR ASC(NA$)>127)ANDF<>&H89 THEN 6100
6080 IFF=&H89 THENN=9:X=18:GOTO6100
6090 ON FLAG GOSUB7000,8000,8000,9000
6100 NEXTN,X
6110 RETURN
6990 '********SUBRT TO READ FILE HEADER*****
7000 SREADDR,TR(0),SK(0),A$,B$:TY=ASC(MID$(A$,2,1)):ST=ASC(MID$(A$,3,1))*256+ASC(MID$(A$,4,1)):LN=ASC(MID$(A$,5,1))*256+ASC(MID$(A$,6,1)
):EX=ASC(MID$(A$,7,1))*256+ASC(MID$(A$,8,1)):IFASC(LEFT$(A$,1))<>85 THEN TY=3
7010 IF TY<>2 THEN ST=0:EX=0
7015 IF TY=3 THEN LN=FA(13)+(FA(12)+FA(9)+FA(6)+FA(3)-1)*256
7020 K=8
7030 IFASC(MID$(NA$,K,1))=0THENMID$(NA$,K,1)=" ":K=K-1:GOTO7030
7040 PRINT#-2,NA$+"."+EX$;" ";FT$(TY-1);" ";:PRINT#-2,USING"#####";ST;
7050 PRINT#-2,USING"#######";LN;EX;
7060 FORJ=0 TO 3:PRINT#-2,USING"####";TR(J);SK(J);FA(3*J+3);:PRINT#-2," ";:NEXT
7070 IFF=2THENF$="P"ELSEIFF=&H81 OR F=&H80 THEN F$="K"ELSEF$=" "
7080 PRINT#-2,"  ";F$
7090 LC=LC+1
7100 RETURN
7990 '********PROTECTION ROUTINE*********
8000 IFF<>0ANDF<16ANDF>126THENRETURN
8010 IFEX$="DAT"THEN RETURN
8020 NC$="":FORY=1 TO 8
8030 NB$=MID$(NA$,Y,1):IF ASC(NB$)<32 OR ASC(NA$)>127 THEN8050
8040 NC$=NC$+NB$
8050 NEXT:IFFLAG=2THEN PROTECTONNC$+"."+EX$
8060 IFFLAG=3THEN PROTECTOFFNZ$+"."+EX$
8070 CLOSE:RETURN
8990 ******SUBROUTINE FOR RESTORING KILLED FILE**********
9000 IF LEFT$(NA$,LEN(NB$))<>NB$THEN RETURN
9010 MID$(X$,N*25+1,1)=CHR$(0)
9020 A$=LEFT$(X$,128):B$=RIGHT$(X$,122)+RIGHT$(Y$,6):SWRITEDR,20,X,A$,B$
9030 CLS:PRINT"file restored":FOR I=1 TO 2000:NEXT:N=9:X=18:RETURN
9990 '******ERROR TRAP***********
10000 IF ERR<128 THEN ER$=CHR$(PEEK(33449+ERR))+CHR$(PEEK(33449+ERR+1)) ELSE ER$=CHR$(PEEK(57107+ERR))+CHR$(PEEK(57107+ERR+1))
10010 CLS:PRINTER$;" ERROR OCCURRED IN LINE ";ERL
10020 ERROR GO TO 10000
10030 PRINT:PRINT"PRESS A KEY TO BE RETURNED TO   THE MENU":EXEC41194:GOTO300
```

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Curtain up!

Terry and *Derek Probyn* provide a theatrical opening

TAKE your Dragon to the theatre with a machine code routine to split the screen horizontally, and reveal a hidden secret beneath: the curtains are opened by splitting the 'front' screen down the centre, and scrolling it simultaneously left and right to reveal a previously saved screen underneath.

This could be used to hold and display an initial title screen while your program is loading, and then to 'open the curtains' to reveal your second 'hidden' title or game screen.

The routine works by moving the bytes of pages 1 to 4 left and right alternatively from the centre outwards, and replacing them with their equivalent static byte located in the screen beneath, on pages 5 to 8.

The machine code should be loaded first of all. It is 100 bytes long, and resides near Ramtop at address 32640. The code can be loaded either by the Basic Hex Loader in listing 1, or alternatively, for anyone preferring to use their assembler, by the assembly code in listing 2.

When loading in the basic, it is necessary to reserve all eight graphics pages by use of the PCLEAR8 command. Pages 5 to 8 contain the 'hidden' screen to be revealed last, and pages 1 to 4 contain the first screen to be viewed.

Space is reserved for the machine code by CLEAR 100,32640. This is shown in line 20 of the Hex Loader. Enter 'EXEC 32640' whenever you wish to 'open the curtains'.

Each time the machine code is executed, pages 5 to 8 are transposed to pages 1 to 4. This means that the latter are always over-drawn, so that if you require the original screen again, it must be re-drawn before any further EXEC 32640 command. Pages 5 to 8 however, the 'hidden' screen, will still reside in memory and need not be redrawn.

Because PMODES 0 and 2 use a 16 byte screen width, and the machine code requires a 32 byte width, then your program should use only PMODES 1, 3 or 4.

A demonstration program is shown in listing 3.

In line 30, the machine code is protected and the necessary eight graphics pages are reserved. Lines 90 to 370 contain the draw data for the front screen, pages 1 to 4, and lines 380 to 590 the data for the 'hidden' screen, pages 5 to 8. Line 630 pulls the rope to 'Open The Curtains'.

So on with the show!

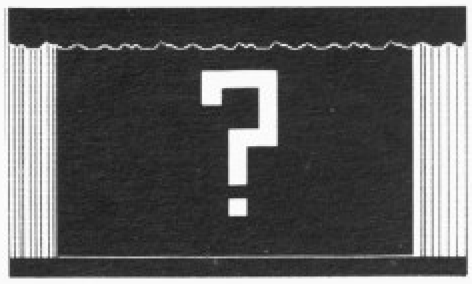
Listing 1




```
10 'BASIC HEX-LOADER FOR SPLIT S
CREEN M/C ROUTINE
20 CLEAR100,32640
30 CLS:PRINT"SPLIT-SCREEN LOADER
"
40 FORX=32640 TO32740
50 READA$
60 CHECKSUM=CHECKSUM+VAL("&H"+A$
)
70 POKEX,VAL("&H"+A$)
80 NEXT
90 IFCHECKSUM<>7567 THENPRINT"DA
TA ERROR-RECHECK ENTRIES"
100 DATAC6,0F,34,04,8E,06,00,31,
84,C1,00,27
110 DATA07,5A,A6,01,A7,80,20,F5,
8D,41,35,04
120 DATA34,04,31,A8,20,30,A4,10,
8C,1E,00,2C
130 DATA02,20,E2,8E,06,1F,31,84,
C1,00,27,09
140 DATA5A,A6,1F,A7,84,30,1F,20,
F3,8D,1C,35
150 DATA04,34,04,31,A8,20,30,A4,
10,8C,1E,10
160 DATA2C,02,20,E0,35,04,C1,00,
27,12,5A,34
170 DATA04,20,AD,34,10,30,89,18,
00,E6,84,35,10,E7,84,39,39
180 'TO SAVE CODE, ENTER CSAVEM
"SPLITSCR",32640,32740,32640
```

Listing 2

```
4E21                  *********************
4E21                  ****** SPLIT SCREEN *
4E21                  ****** T & D PROBYN *
4E21                  *********************
7F80   7F80                   ORG    32640
7F80                          PUT    32640
7F80  C60F                    LDB    #15
7F82  3404                    PSHS   B
7F84  8E0600          START   LDX    #1536
7F87  3184                    LEAY   ,X
7F89  C100            LLOOP   CMPB   #0
7F8B  2707                    BEQ    LNXTRW
7F8D  5A                      DECB
7F8E  A601                    LDA    1,X
7F90  A780                    STA    ,X+
7F92  20F5                    BRA    LLOOP
7F94  8D41            LNXTRW  BSR    COPY
7F96  3504                    PULS   B
7F98  3404                    PSHS   B
7F9A  31A820                  LEAY   32,Y
7F9D  30A4                    LEAX   ,Y
7F9F  108C1E00                CMPY   #7680
7FA3  2C02                    BGE    RSCRL
7FA5  20E2                    BRA    LLOOP
7FA7  8E061F          RSCRL   LDX    #1567
7FAA  3184                    LEAY   ,X
7FAC  C100            RLOOP   CMPB   #0
7FAE  2709                    BEQ    RNXTRW
7FB0  5A                      DECB
7FB1  A61F                    LDA    -1,X
7FB3  A784                    STA    ,X
7FB5  301F                    LEAX   -1,X
7FB7  20F3                    BRA    RLOOP
7FB9  8D1C            RNXTRW  BSR    COPY
7FBB  3504                    PULS   B
7FBD  3404                    PSHS   B
```

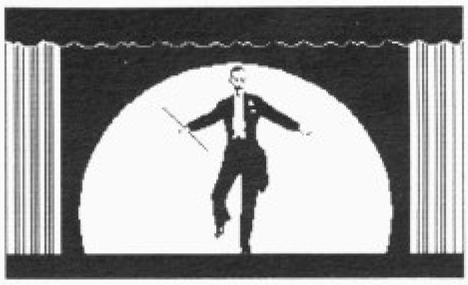


continued.

```
7FC2 30A4            LEAX  ,Y
7FC4 108C1E10        CMPY  #7696
7FC8 2C02            BGE   DECPAS
7FCA 20E0            BRA   RLOOP
7FCC 3504     DECPAS PULS  B
7FCE C100            CMPB  #0
7FD0 2712            BEQ   FINISH
7FD2 5A              DECB
7FD3 3404            PSHS  B
7FD5 20AD            BRA   START
7FD7 3410     COPY   PSHS  X
7FD9 30891800        LEAX  6144,X
7FDD E684            LDB   ,X
7FDF 3510            PULS  X
7FE1 E784            STB   ,X
7FE3 39              RTS
7FE4 39       FINISH RTS
7FE5
```

Listing 3

```
10 'OPEN THE CURTAINS-DEMONSTRAT
ION PROGRAM
20 'TERRY & DEREK PROBYN: 1986
30 CLEAR400,32640:PCLEAR8
40 DIMA(76)
50 PMODE4,5:PCLS1
60 CLS:PRINT@70,"*** PLEASE WAIT
 ***
70 PRINT:PRINT"** DEMONSTRATION
BEING DRAWN **
80 PRINT:PRINT"** PRESS ANY KEY
AFTER 'BEEP' **
90 PMODE4,1:PCLS1
100 'curtain top
110 COLOR0
120 CT$="RFRFRER2F2R7E4FRFR3FRFR
3ERERERFRFRFR5ERER3FRFR3E3":DRAW
"BM0,44"+CT$+"NU44"
130 PAINT(0,0),0,0
140 GET(0,0)-(63,47),A,G
150 FORX=64TO192 STEP64
160 PUT(X,0)-(X+63,47),A,PSET
170 NEXT
180 'stage
190 LINE(0,168)-(255,191),PSET,B
F
200 LINE(0,0)-(255,191),PSET,B
210 SCREEN1,0
220 IFTU=0 THENFORX=1TO4:PCOPYX
TOX+4:NEXT:
230 'draw data
240 A$="BR7L3H4U27E4R3BD8D19
250 B$="U35R17F4D13G4BL10;BU7U7R
6FD5GL6;BD7D14L7
260 DRAW"BM78,95;XA$;FR5EU19HL5;
BU7R9F4D27G4L9;BM+18,+0;XB$;BR7B
U14R10
270 DRAW"BR9;BD14;U35R21D7L14D7R
10D7L10D7R14D7L21
280 N$="U35R7DFDFDFDFDFDFDFU14R7
D35L7UHUHUHUHUHUHUHD14L7":DRAW"B
R26"+N$
290 DRAW"BM118,99;L12D4R4D14R4U1
4R4U4;BR4;D18R4U7R4D7R4U18L4D7L4
U7L4;BR16;D18R11U4L7U3R5U4L5U3R7
U4L11
300 DRAW"BM36,156;XA$;FR12D7L13;
BU35R13D7L12;BR17BU7;R7D27FR4EU2
7R7D31G4L12H4U31
310 DRAW"BM86,156;XB$;BR7BU14;DF
6D7R7U9H5;BM125,156;L7U28L8U7R23
D7L8D28
320 DRAW"BM143,144;D12L7U31E4R12
F4D31L7U12L6;BU7U8ER4FD8L5;BM161
,156;U35R7D35L7
330 DRAW"BR12;XN$;BR29;H4U6R7D3R
5EU6HL8H4U13E4R12F4D6L7U3L5GD5FR
8F4D14G4L12
340 ' draw front curtains
350 X=0
360 LINE(X,0)-(X,168),PSET
370 X=X+RND(4)+1:IFX<256 THEN360
380 'draw to back screen
390 IFTU>1 THEN600
400 PMODE4,1:SCREEN1,0:PMODE4,5
410 COLOR0:CIRCLE(128,144),88
420 X=0
430 LINE(X,44)-(X,168),PSET
440 X=X+RND(4)+1:IFX<32 THEN430
450 X=225
460 LINE(X,44)-(X,168),PSET
470 X=X+RND(4)+1:IFX<255 THEN460
480 PAINT(64,64),0,0
490 COLOR1:DRAW"BM0,44"+CT$+CT$+
CT$+CT$
500 'draw data
510 COLOR0:DRAW"BM128,59;R3NF2FL
5GNR4D4RF2UBR2RDF1;BL8BU2;DF4EFR
L4DR2GD2RD1
520 PSET(134,66,0)
```



```
530 DRAW"BL3UD13GD6FD2LDGDR3E2D2
R4EHU2HUEU3HU16;RFR2FR2FRFDFRF2R
F3RFRFRF2RF2RF2
540 DRAW"BF5EGLBL2H3UD2L3HL2HLHL
HLHLHLHLHLHGDGD2GD8FD2F4D2FD10FD
5GDGDGLUHGD3GD5GD6GD6
550 DRAW"GD3GD3FD4LUL3GRU3HU18EU
22;HLG2DGDGDGDGD2GD4FD2FDFDGLG
DGD4G3ULUER2HU3RL2ND4HU4HU8HU3
560 DRAW"EU2EU2EUEU3EU2EU3EU5EU2
EU7HU3HU2HLGLG2LGL2GL2GLGL2HDG1;
NF10BH3BG2DBE2BUNH11;REFU2ERERER
E2R2ERE4UEURER2ERE
570 DRAW"BM136,78;RFDFGDF2GL2HEU
2LHU2
580 PAINT(120,84),0,0:PAINT(136,
96),0,0
590 TU=2
600 SOUND99,1:PMODE4,1:SCREEN1,0
610 'split the screen
620 IFINKEY$="" THEN620
630 EXEC32640:SOUND70,1
640 IFINKEY$="" THEN640
650 PMODE4,5:SCREEN1,0:GOTO90
```

Missile attack

Destroy deadly alien missiles in a game by ***D King***

MISSILE ATTACK is a version of the arcade game *Missile Command*. You must protect thirteen cities on the planet surface from destruction by deadly alien missiles. To do this the end of the vapour trail must be caught in one of your explosions. Up to ten explosions can be on screen at one time. If you fail to destroy a missile it will reduce one of your bases or cities to rubble.

Your cities are at the bottom of the screen with your three bases left, right and centre. When you fire using the right joystick button a missile will be fired from one of these bases. The number of missiles in each base is displayed underneath. If all bases have been destroyed you can no longer fire. Your sight is moved with the joystick and will wrap round the left and right side of the screen. The game lasts as long as you have one city remaining (not the base).

The game is written in Basic and machine code, the machine code being the main game, and features hires colour graphics, ten levels and a hi score table with ten entries. The Basic program sets up the random positions, direction, speed of each missile,controls the hi score table and draws the screen display.

The difficulty for each level can be changed by altering the variables in lines 400-490. B1-B3 are the number of your missiles in each base. MI is the number of alien missiles up to a maximum of forty, and S1-S2 are the speed range for the missiles. The hi score table can be used in any program with a little alteration. The variables SI in line 700 sets the maximum number of entries.

During play you gain ten points for destroying a missile and between levels the number of cities/bases and unused missiles are added to your score. Missiles are worth 100 points and cities are worth 200 points. You are given an extra city even 10,000 points if needed.

To enter the game start by typing in listing 1. This is the Basic program. Do not run it, but save it to tape and type in the hex loader, listing 3. Start entering the string of hex digits in listing 2, followed by 'ENTER', then the checksum. When this is complete it can be saved after the Basic with CSAVEM "MISCODE", &H232A,&H299E,&H232A. If you enter this in parts don't forget to use PCLEAR8 before loading. TO play the game load in the Basuic program and RUN it; this will load the machine code.

If you don't feel like entering the program I can supply a copy on tape with an autorun version on one side. Send £2.00 to Desmond King, 68 Farnham Street, Ormeau Road, Belfast BT7 2FN.

Listing 1

```
0 REM *****MISSILE ATTACK*****
1 REM *****BY DESMOND KING****
2 REM $235A=INVERT,BORDER
3 REM $232A=ZAP SOUND
4 REM $238C=INITILIZE
5 REM $23EB=GAME
10 PCLEAR8:GOSUB700:POKE65495,0
20 '**restart point of program**
30 EXEC &H238C:E=&H1
40 CLS:PRINT@&H29,M$
50 PRINT@&H46," (C) 1986 DESMOND KING.":GOSUB670
60 PRINT@&H103,"ENTER START LEVEL 1-10";:INPUT LE:IF LE<&H1 OR LE>&HA THEN SOUND
1,1:EXEC&H232A:SOUND190,1:GOTO40
70 CLS:LE=LE-1
80 GOSUB1100:LE=LE+-(LE<&HA):ON LE GOSUB 400,410,420,430,440,450,460,470,480,490
90 GOSUB510:SCREEN1,0
100 '*******exec main game******
110 EXEC &H23EB:A$="T255L255V31ABCDEFGGV20FEDCBA":PLAY A$+A$
120 '***************************
130 AD=&H238E:GOSUB630:SC=T
140 '***get remaining misiles***
150 M=&H0
160 AD=&H208A:GOSUB200
170 AD=&H20A2:GOSUB200
180 AD=&H20B7:GOSUB200
190 GOTO230
200 IFPEEK(AD) THEN M=M+PEEK(AD+&H1)*&HA+PEEK(AD+&H2)
210 RETURN
220 '****get remaining cities***
230 CI=PEEK(&H1E02)
240 CLS:IF CI THEN PRINT@&H24,"YOU HAVE REACHED LEVEL";LE+-(LE<&HA)
250 PRINT@&HA8,"CITIES    ";CI:PRINT@&HC8,"MISILES   ";M
260 '********update score*******
270 SS=SC+M*&H64+CI*&HC8
280 FORP=SC TO SS STEP &H64:PRINT@&HE8,"SCORE     ";P:EXEC&H232A
290 IF P<E*10000 THEN NEXT:GOTO350
300 '*give extra city if needed*
310 E=E+&H1:FORP1=&H208A TO &H20B9 STEP &H3:IF PEEK(P1) THEN NEXT:NEXT:GOTO 350
320 POKEP1,&H1:POKE&H1E02,PEEK(&H1E02)+&H1:PRINT@&H109,"bonus city":PLAY "V3105T
255CDCFCACDCFCACDCFCA":NEXT P
330 CI=CI+-(CI=0)
340 '***************************
350 T=SS:SC=SS:AD=&H238E:GOSUB650
```

Listing 1 (continued)

```
360 GOSUB 670
370 IFCI=1 THEN AD=&H208A:IF PEEK(AD) THEN 770 ELSE IF PEEK(AD+&H18) THEN770 ELS
E IF PEEK(AD+&H2D) THEN 770
380 IF CI THEN 80 ELSE 770
390 '*subroutines for each level
400 B1=1:B2=1:B3=2:MI=4:S1=10:S2=S1:RETURN
410 B1=2:B2=2:B3=1:MI=6:S1=8:S2=6:RETURN
420 B1=3:B2=3:B3=4:MI=12:S1=5:S2=5:RETURN
430 B1=4:B2=4:B3=4:MI=16:S1=3:S2=2:RETURN
440 B1=8:B2=8:B3=9:MI=20:S1=2:S2=1:RETURN
450 B1=6:B2=8:B3=6:MI=25:S1=1:S2=1:RETURN
460 B1=8:B2=8:B3=8:MI=27:S1=1:S2=1:RETURN
470 B1=9:B2=8:B3=8:MI=32:S1=1:S2=1:RETURN
480 B1=8:B2=9:B3=8:MI=34:S1=1:S2=1:RETURN
490 B1=5:B2=5:B3=5:MI=12:S1=1:S2=0:RETURN
500 '*set initail direction,speed ,angle,position
510 AD=&H1F5E:POKE&H1E00,MI:FORP=AD TO AD+MI*&H7 STEP &H7:POKEP+&H6,0:NEXT:FORP=
AD TOAD+MI*&H7 STEP &H7
520 SP=S1+INT(RND(S2)):AN=&H3+RND(&H6):DI=RND(&H2):IF DI=&H1 THEN DI=&HFE
530 POKEP,SP:POKEP+&H1,SP:POKEP+&H2,RND(&H18):POKEP+&H3,RND(&HFF):POKE P+&H5,AN:
POKEP+&H4,AN:POKEP+&H6.DI:NEXT
540 IF LE>&H4 THEN POKEAD+&H1,&H1:IF LE<&H6 THEN POKEAD+&H8,&H1
550 POKE &H2394,INT(LE/&HA):POKE&H2395,LE-(INT(LE/&HA)*&HA)
560 '*****set misiles in bases***
570 AD=&H208A:B=B1:GOSUB610
580 AD=&H20A2:B=B2:GOSUB610
590 AD=&H20B7:B=B3:GOSUB610
600 RETURN
610 IF PEEK(AD) THEN POKEAD+&H1,INT(B/&HA):POKEAD+&H2,B-INT(B/&HA) ELSE POKE AD+
&H1,&H0:POKEAD+&H2,&H0
620 RETURN
630 T=0:C=&H1:FORP=AD+&H5 TO AD STEP-&H1:T=T+(PEEK(P)*C):C=C*&HA:NEXT
640 RETURN
650 C=100000:FORP=AD TO AD+&H5:CC=INT(T/C):POKEP,CC:T=T-CC*C:C=C/&HA:NEXT
660 RETURN
670 POKE&H236F,&H8F+RND(&H7)*&H10:EXEC &H235A
680 RETURN
690 '*****setup and load M/C****
700 SI=&H9:DIMHS$(SI),HI$(SI):FORP=0 TO SI:HS$(P)="000000":HI$(P)=STRING$(&HD,".
"):NEXT
710 FORP=&H2396 TO &H239C:POKEP,&H0:NEXT
720 M$="MISSILE ATTACK":CLS:PRINT@&H9,M$:PRINT@&H26,"(C)1986 DESMOND KING."
730 SCREENO,1:CLOADM"MISCODE"
740 RETURN
750 '****************************
760 '**********game over*********
770 FORP=1TO&H3E8:NEXT:CLS:PRINT@&H10A,"GAME OVER!!"
780 FORP=1 TO &H32:EXEC &H232A:GOSUB670:NEXT
790 '*******hi-score table******
800 CU=1:SC$=MID$(STR$(SC),2):FORP=SI TO &H0 STEP-&H1:IF SC>=VAL(HS$(P)) THEN 83
0 ELSE NEXT
810 GOTO 930
820 '*********enter name*********
830 IF P=&H0 OR SC=VAL(HS$(P)) THEN 850
840 FORP1=1 TO P:HS$(P1-1)=HS$(P1):HI$(P1-1)=HI$(P1):NEXT
850 P1=P:AD=&H46D+P*&H20:HI$(P)="":HS$(P)=STRING$(6-LEN(SC$),"0")+SC$:GOSUB 950:
P=P1:PRINT@&H1C8,"ENTER YOUR NAME";
860 GOSUB670:SCREENO,1
870 POKE &H87,&H0
880 GOSUB1060:A=PEEK(&H87):IF A=&H0 THEN 880 ELSE IFA=&H8 THEN 910 ELSEIF A=&HD
THEN 930
890 LE=LEN(HI$(P)):IF LE>&HC THEN 880
900 HI$(P)=HI$(P)+CHR$(A):POKEAD,A AND &HBF:AD=AD+&H1:GOTO870
910 LE=LEN(HI$(P)):IF LE THEN HI$(P)=LEFT$(HI$(P),LE-&H1):POKEAD,&H20:AD=AD-&H1:
POKEAD,&H9F
920 GOTO 870
930 GOSUB 950:GOTO990
940 '***print hi-score table***
950 CLS:PRINT@&H29,M$:PRINT@&H49,"HI-SCORE TABLE":FORP=&H0 TO SI:PRINTTAB(&H5);H
S$(P);TAB(&HD);HI$(P):NEXT
960 RETURN
970 '****************************
980 '*****ask for new game*****
```

```
990 PRINT@&H1C0,STRING$(&H20," ");:PRINT@&H1C6,"PRESS BUTTON TO PLAY";
1000 GOSUB670:FORP=&H1 TO &H6E:IF PEEK(&HFF00)AND&H1 THEN NEXT:GOTO 1000
1020 '**check for highest score*
1030 HS=VAL(HS$(SI)):AD=&H2396:GOSUB630:HI=T:IF HS<=HI THEN 30 ELSE T=HS:GOSUB65
0:GOTO30
1050 '********flash cursor******
1060 CU=CU-&H1:IF CU THEN RETURN ELSE CU=&HF:IF PEEK(AD)=&H20 THEN POKEAD,&H9F E
LSE POKE AD,&H20
1070 RETURN
1080 '***************************
1090 '***draw screen display****
1100 PMODE3,1:PCLS2:COLOR4
1110 LINE(0,0)-(255,8),PSET,BF
1120 E$="U4R4BD2BL4R2BL2BD2R4":L$="U4BD4R4
1130 DRAW "BM3,6;C2;R4U2L4U2R4;BD4BR4U4R4BD4L4BR8;U4R4D4L4BR8;U4R2BDBRRBDBL2LBDB
R2D1;BR4;XE$;
1140 DRAW "BM110,6;XL$;BR4;XE$;BR6UBL2U3BD3BR4U3BD4BR4;XE$;BR4;XL$;
1150 DRAW"BM186,6;U4BD2R4U2D4BR4R4BL2U4L2R4
1160 COLOR 4,2:LINE(0,183)-(255,191),PSET,BF:LINE(0,183)-(255,183),PRESET:LINE(0
,191)-(255,191),PRESET
1170 COLOR 2:LINE(103,0)-(103,8),PSET:LINE(179,0)-(179,8),PSET
1180 RETURN
```

Listing 2

```
232A: 5FBDBAC5C63F863F8008 = 4FD
2334: 4F8D085CC16426F47EBA = 4B7
233E: C33402484[illegible]402B6FF20 = 394
2348: 8403AAE4B7FF20326135 = 4B3
2352: 0234045A26FD35848E04 = 302
235C: 003410EC8484BFC4BFED = 567
2366: 818C060025F3AEE4CCAF = 538
2370: 20A784A[illegible]E030015A = 3E7
237A: 26F53510C60FA784A788 = 48F
2384: 1F3088205A26F5392018 = 2DD
238E: 00000000000000000000 = 0
2398: 00000000000100000000 = 1
23A2 010000003408861E1F8B = 18B
23AC: 8E238EC6086F805A26FB = 477
23B6: 861097028E1F2CC60A6F = 347
23C0: 8430045A26F98E208ACC = 435
23CA: 0110A78430035A26F90F = 2F7
23D4: 170F158605971886O997 = 29B
23DE: 168606971 48E26D0BF23 = 3B3
23E8: A4358886 1E1F8B8E0600 = 343
23F2: 9F1A0F1CCE238E8E0646 = 33D
23FC: C606BD27ABCE23968E06 = 476
2406: 5AC606BD27ABCE23948E = 4C8
2410: 0654C602BD27ABBD26B7 = 44B
241A: 8696F60119DD128E2812 = 3E3
2424: BD26EC0F019600970386 = 395
242E: 109711CE208ACCAF0034 = 3DF
2438: 066DC427155D270DC180 = 345
2442: 2709C1EF24058E283820 = 317
244C: 088E284A20038E285CBD = 2FA
2456: 26EC3506CB1033430A11 = 2B9
2460: 26D5BE23A43006BF23A4 = 43C
246A: 8C26E223308E26D6BF23 = 453
2474: A420283406DC12C00120 = 2F5
247E: 1C3406DC12CB01201434 = 278
2488: 06DC128109230C4A2009 = 220
2492: 3406DC1281A324014CDD = 39A
249C: 123586BD25870A142622 = 29C
24A6: 86039714BDBD52FC015A = 457
24B0: 811422028DC181322502 = 2E1
24BA: 8DC3C11422028DC5C132 = 48E
24C4: 25028DCA8E2812DC12BD = 3F1
24CE: 26ECBD25870A19260D86 = 357
24D8: 289719B6FF0084012602 = 33A
24E2: 8D078D5ABD258720B496 = 44E
24EC: 159116244E108E1D208E = 297
24F6: 208A6D842704EC012615 = 2EE
2500: 6D88182705EC8819260F = 2FB
250A: 6D882D2730EC882E260D = 34E
2514: 393001200E31A8103088 = 239
251E: 19200631A81E30882EBD = 2D9
2528: 277ECE1F2C6DC4270433 = 34D
2532: 4420F86CC4DC12ED416F = 517
253C: 430C15390A1827013986 = 1A6
2546: 08971896174848CE1F2C = 30D
2550: 33C66DC42726A6438E28 = 416
255A: 6EC6263D308BEC41BD26 = 462
2564: ECA6434C81062204A743 = 3B8
256E: 200CEC418E2978BD26EC = 457
2578: 0A156FC496174C911625 = 317
2582: 014F9717398E04009F1A = 282
258C: CE1F5ED60186073D33CB = 3EA
2596: 6D46273CEC4281182334 = 334
25A0: BD274A341454D70DEAE4 = 47C
25AA: E484D10D2703BD265135 = 3D9
25B4: 146AC4261DA641A7C4D7 = 4AE
25BE: 0D54AD9F23A4E7846A44 = 48D
25C8: 260AA645A744A643AB46 = 3E0
25D2: A7436C4296014C910025 = 331
25DC: 014F97018E06009F1A39 = 26E
```

```
25E6: 32656A448D2EE6435454 = 3D1
25F0: 5454340486103D86BF8E = 386
25FA: 285CBD26EC350486033D = 352
2604: 8E208A3A6D8427046F84 = 381
260E: 0A020A0326C24F1F8B32 = 22C
2618: 6239860197146046EC42 = 3A1
2622: 811925273404BD274AD7 = 323
262C: 0D040D53E484DA0DE784 = 42B
2636: E6445CE744E14525096F = 474
2640: 4435044AEB4620DA3504 = 32B
264A: 4A20D56F463939A64281 = 3CF
2654: C4248F108E1F2C860A97 = 387
265E: 116DA42738EC21DD0D10 = 388
2668: 931227E4C30C18DD0FEC = 46F
2672: 42910D2524910F2520D1 = 2DF
267C: 0E251CD1102218347680 = 2A1
2686: 1B35766A448D8D32650A = 32F
2690: 031026FF414F1F8B3262 = 306
269A: 3931240A1126BE390F1C = 1F1
26A4: C6068E238ECE239EBD27 = 47E
26AE: 611F138E06467E27AB86 = 343
26B8: 01971CCE208B8E1D20BD = 3B5
26C2: 27ABCE20A38E1D30BD27 = 422
26CC: ABCE20B88E1D3E7E27AB = 48A
26D6: DA0D53E4843953E484DA = 57C
26E0: 0D39DA0DD70D53E484DA = 4A6
26EA: 0D393456DD04EC840D06 = 404
26F4: 330296078B0744444497 = 2C7
26FE: 09DC048D47D70AD6093A = 3B7
2708: 86FFD607C40627054 45A = 3F6
2712: 26FC43D60A3D58494353 = 3B9
271C: DD0B301F9F0F96069708 = 320
2726: A6C0D60A3D5849DD0DEC = 4FA
2730: 84940BD40CD30DED8430 = 484
273A: 88200A0826E69E0F86FF = 3F8
2744: 0A0926CD35D634464456 = 325
274E: 44564456D31A1F013506 = 27C
2758: C406CE27D8E6C535C0D7 = 60E
2762: 113A33C5A682ABC28109 = 462
276C: 2207A7840A1126F2396F = 32F
2776: 846C1F0A1126E939C602 = 33A
2780: D7113ACE239EE6C2A682 = 581
278A: D70D900D2B11A7840A11 = 303
2794: 26F01F131F21CC010297 = 2EE
279E: 1C200AA6848B0A900D6A = 30C
27A8: 1F20E53404D7113410A6 = 32E
27B2: C0C6053D108E27E031A5 = 443
27BC: C605A6A00D1C27028A55 = 342
27C6: A7843088205A26F03510 = 3B8
27D0: 30010A1126D935848040 = 2C4
27DA: 20100804020 1CF333333 = 1A7
27E4: CFCF0FCFCF0303F3033F = 486
27EE: 0303F3C3F303F3C33303 = 49E
27F8: F3033F03F303033F0333 = 2A5
2802: 030333F3CFCF03330333 = 336
280C: 03033303F3CF0C124040 = 29C
2816: 40404040404040404040 = 280
2820: 5555F5DDD7FFD7DDF555 = 750
282A: 5555555575D757F755D = 3CE
2834: 57555555081055656569 = 2F6
283E: AAAAAAAA55595A6A6AAA = 52E
2848: AAAA08105595E5F9F9FE = 62B
2852: FEFE55565B6F6FBFBFBF = 61D
285C: 081055555555566699AA = 36B
2866: 5555555565A5699A0C18 = 385
2870: 55555555555555555555 = 352
287A: 5555555555555555D7F = 384
2884: 7F5D5555555555555555 = 384
288E: 5555555555550C185555 = 2CC
2898: 5555555555D555555555 = 3D2
28A2: 55555555555D7FFF7F5D = 460
28AC: 55555555555555555555 = 352
28B6: 55555550C18555555555 = 2CC
28C0: D555D5F5D55555D55555 = 5F2
28CA: 5555DD7FFFFFFF7F5DD5 = 6B4
28D4: 55555555555555575555 = 354
28DE: 55550C1855555555D575 = 36C
28E8: F5FD7DF5D55555F5555D = 5EA
28F2: FF7FF7D5F77FFFC15555 = 72A
28FC: 55555557575F5F575555 = 36C
2906: 0C1855555555DD75F57D = 43C
2910: 7DF5D5555555555DFF77 = 56E
291A: D555D57DFF5D55555555 = 52C
2924: 5D57575F5F5755570C18 = 2F0
292E: 55555555DD75755D5D75 = 44A
2938: D5755555555[illegible]F575555 = 4A6
2942: 557DFF5D555555555D57 = 436
294C: 575D5D5755570C185555 = 2E2
2956: 55555D57555D5D555755 = 36E
2960: 5555555DD55555555555 = 3DA
296A: D55D55555555DD75555D = 48A
2974: 5D11D5750C1855555555 = 330
297E: 5555555555[illegible]55555555 = [illegible]52
2988: 55555555555555555555 = [illegible]
2992: 55555555555555555555 = [illegible]
299C: 55550000000000000000 = [illegible]
```

Listing 3

```
10 PCLEAR8
20 CLS:INPUT"START ADDRESS";ST
30 INPUT "END ADDRESS";EN
40 FORP=ST TO EN STEP 10
50 CK=0
60 PRINT HEX$(P)": ";
70 LINEINPUTA$
80 IF LEN(A$)<20 OR LEN(A$)>20 THEN 170
90 A=1:FORPO=0 TO 9
100 VA=VAL("&H"+MID$(A$,A,2))
110 POKEP+PO,VA:CK=CK+VA
120 A=A+2:NEXT
130 INPUT "=";C$
140 IF VAL("&H"+C$)<>CK THEN 170
150 NEXT
160 END
170 PRINT "error:-re-enter"
180 SOUND190,2
190 GOTO60
```

Analyzing costs

L Pilz's worksheet helps you update accounts and manage finances

ANALYZER will enable you to put your Dragon to work analyzing purchases, budgets and projects. It is a worksheet where, if any quantity is changed, all results are updated. This allows you to ask 'what if this amount is changed will be the cost, or lead time, or profit?

The quickest way to appreciate Analyzer is to refer to an example (Fig. 1), a supermarket price survey.

The worksheet is divided into cells indentified by a letter (column) and number (row). 'Item' is in cell A00. 'Move %' is in cell I13. If you now change the value in F04 which is now .99, the values of F07, J07, J10 and J13 also change.

Any cell that contains a quantity can be used in a calculation with other cells. With *Analyzer*, you can add, subtract, multiply, divide, raise to a power and calculate percentages. You can also sum columns and rows. Row and column headers can be displayed plus an extra line from anywhere on the worksheet. Any column and row can be used for headers. Data can be saved to tape or disc and sent to the printer.

Analyzer uses the standard text screen and displays only four columns and twelve rows at a time but total capacity is ten columns and 100 rows for a massive 1000 cells. The screen always displays the column letters at the top and row numbers on the side. The READY prompt under row twelve indicates that the program is ready for more action.

Cursor control

Move the cursor around the sheet with the arrow keys. The screen will scroll in one or four directions if the cursor tries to leave the screen. For faster moving use the shift/right arrow key. You can now nominate the top left cell of the display window up to row 88 and column G. Use the shift/left arrow as a home key. It returns you to the first cell in one keystroke. If the READY prompt is replaced with any of the following options then the left arrow reverts to a backspace/corrector key.

As soon as you type a letter or number the READY prompt changes to an INPUT prompt. You can now continue to enter words or amounts up to six characters. When the sixth character is typed the bell sounds but you can still backspace with the left arrow and make corrections. Press ENTER to transfer the data into the cursor cell. INPUT can be aborted anytime with the CLEAR key. Nil entries are rejected.

Analyzer will perform up to 100 calculations and each calculation can have seven operations involving up to eight cells. Move to the cell where the result is to appear. Now press the plus key (Shift ;). The READY prompt will immediately change to a FORMULA prompt. Any cell number in a formula must have two digits. Therefore the first cell multiplied by the second cell is entered as A00*B00. Once the ENTER key is pressed the formula is displayed below the READY prompt and again whenever the cursor is at the cell.

On the survey sample J13 shows J10%J11-J03. If only one cell is entered as a formula it has the effect of duplicating that cell into the cursor cell, if it's a number. This can be useful where, say with a budget, a common rent amount is in each column. If the rent changes (read increases) all the cells can be changed in one stroke. To raise a number to a power use the up arrow. eg A00(up arrow)B00. Note that raising to .5 gives square roots and .33333 cube roots etc.

Once formulii and sums (see Rsm, Csm) are entered, the program slows and they should be entered last or see Cycs. If an illegal formula is entered, an INPUT ERROR message may appear. After 100 calculations are entered a NO ROOM message will show. Press any key with both messages to return to READY. If you change your mind you can return to READY with the CLEAR key.

For access to a dozen other commands press slash (/). The READY now changes to a command prompt and menu. Press the inverse printed letter to execute the option of the abbreviated word it belongs to. Most can be aborted with the CLEAR key while incorrect responses usually result in INPUT ERROR. Some require you to press Y to proceed, any other will abort the command. Incorrect responses to the ROW prompt default to zero allowing simply pressing ENTER to mean zero row.

R(I)n inserts a blank line if there is room. Use it with caution as there is now row delete facility. All calculations are adjusted and obviously it will take a while. If you are using a cell in row 99 then there is NO ROOM.

(P)rint is for hard copy and prompts you for the start row to be printed and prints to the line of the cursor. You have the option of printing with or without cell identifiers (grid).

Prin(T) allows you to give the printout a title limited to 30 characters. To erase the title press ENTER after (T) use abort with the CLEAR key. An 80 character printer must be on-line for printing.

(S)tore is for (C)assette saving and (L)oading or (D)isc saving and lo(A)ding whichever inverse letter you press. The tape monitor and audio are on for positioning when the OK? prompt appears. The filename must start with a letter and contain only letters and numbers. It is automatically limited to 8 letters and nil entries are rejected.

(F)line lets you display a line at the foot of the screen. This enables you to display a grand total cell hundreds of cells from current input.

Flin(E) erases the footline. If the last cell of Fline exceeds 7 characters due to the result of a calculation the screen will scroll and the cursor will point at the wrong cell. Choose a different lot and refer also the Dcm.

(B)1 lets you completely blank the cursor cell of all information.

(R)sm sums cells along a row from the left of the cursor cell. You must nominate the starting cell and sum at least two cells. Up to 30 row sums are allowed.

(C)sm sums the column into the cursor cell. You must nominate the starting cell and sum at least two cells. The program allows up to 70.

These sums execute much faster than the formula facility and should be used in preference. Whenever the cursor is at a cell that contains a sum you are notified underneath the READY prompt.

(D)cm sets the number of decimals for accuracy of calculations. Set to two decimal places initially (Money!), and you can alter it at any time from none to four. If large numbers are involved the cells may overflow and print over the next cell. To counter this set Dcm to none and leave the next cell blank. If that's not enough scale the numbers, meaning they are thousands or millions. Sometimes the Dragon wishes to display more decimals regardless.

Fc(0)1 will display any column in the first column as row titles, leaving three working columns. The cursor must not be in the first column at the time. Pressing @ after (0) turns it off. The cursor cannot move to the first column with Fcol.

Note that the program works through formulii in order of entering, then does sums. If a formula uses a sum it will use the sum displayed and the updated sum on the next cycle.

C(Y)cs lets you set the number of calculation cycles within a cycle from none to nine to overcome the above lag. When a number of values need updating, a lot of time is usually saved if nil cycles are set however, you will not know which input may cause an overflow or other crash. When a formula is changed, it is first deleted and then the new formula becomes the last to be calculated.

Ds(K) lets you check a disc directory.

T(L)ine will display any row at the top as column titles.

Tli(N)e means you do Not want a topline.

(?) or shift/slash recalls the summary seen after loading.

A test run

Move to A00 type 1000 and press ENTER. Move right to B00 and enter 99 then right again and press (+). The formula prompt should now have appeared. Enter A00/B00 and C00 should give 10.1 as the

result and the formula displayed under READY. Move down to CØ1 and enter 50 then down again and enter six dashes. If you hit BREAK accidentally, enter GOTO30 to continue again. Move down to C03 and press (/) to bring up the command menu. Press C then enterØ and the column is summed into C03 and press (/) to bring up the command menu. Press C then 1 and the column is summed into C03 with the appropriate message under the READY prompt. Move to D00 and press / then R then A to sum the top row.

Press shift/right arrow then enter 88 to the prompt and then A. This should move the display window to A88 top left.

Press / then F then enter 3 then press C and the result from CØ3 is displayed on the bottom line (Fline). Press (+) and enter C03 and 10.1 appears in B88. Press (/) then L then enter 0 and the first line replaces the normal topline. Press shift/left arrow and we're back at B00. The Topline is now confusing so press / then N.

This should give you a little feel for *Analyzer* and you can now try each command after pressing (/). Note that pressing an invalid key causes a return to the READY prompt or an INPUT ERROR message.

Troubleshooting

Save data regularly. A crash may occur for several reasons such as overflow or disc error. If the program crashes, enter GOTO30 and remove or alter your input. Pressing CLEAR returns to the READY prompt except during saving, loading or updating. You may press RESET then enter CLOSE: GOTO30 to regain control before actual cassette loading. Sometimes the DRAGON will seem hung but is actually consolidating string data which must not be interrupted, just wait.

The program POKES within itself and the first eight lines must be typed exactly as the listing. If you GOTO400 you can compare the memory locations with the values for S1 to S8 in line 335. They should all say 87 or you've got it wrong. Without disk delete 57, 58 and line 6 and 7. Once the program is run they change. Deleie lines 400 onwards when the values are correct. Save the program before running it. You'll have to type to line 54 and 80 RETURN and lines 300 to the end before the display works. Add the move lines at 60 to move to any cell. Now enter to line 109 to enable calculations.

You may not want all COMMAND options such as those connected with the disk or printer. In that case substitute 31 as the line to jump to in lines 58 and 15, as the line to GOSUB to in line 149. Make sure not to confuse the number Øwith the letter O.

I will supply a program on cassette if you can send a money order (not a cheque or postal order) for $8 Australian including airmailing to L. Pilz, 71 Woodville Road, Mooroolbark 3138, Victoria, Australia.

Figure 1 CONSUMER PRICE INDEX SURVEY

	A	B	C	D	E	F	G	H	I	J
Ø	ITEM	UNIT	QTY	COLES	WOOLS	SSW	FRED	7/11		
1	------	------	------	------	------	------	------	------		
2	FLOUR	KG	2	1.28	1.26	1.3Ø	1.32	1.38		
3	MILK	LITRE	2	1.41	1.41	1.41	1.41	1.38		1ØØ
4	BREAD	78ØGME	1	1.2Ø	1.25	.99	1.26	1.28		
5	SUGAR	KG	2	1.19	1.11	1.2Ø	1.2Ø	1.26		TOTAL
6				------	------	------	------	------		------
7			TOTAL	5.Ø8	5.Ø3	4.9	5.19	5.3		25.5
8									STORES	5
9									------	------
1Ø									MEDIAN	5.1
11								PREV'S	MEDIAN	4.95
12								------	------	------
13	DATE	5/56						PRICE	MOVE %	3.Ø3

Figure 2 (with grid)

HOME EXTENSION

	A	B	C	D	E	F	G	H	I	J
Ø	ITEM	UNIT	$EACH	QTY	COST					
1	------	------	------	------	------					
2	FRAME									
3	------									
4	3X6	FOOT	3.5Ø	15Ø	525					
5	2X4	FOOT	2.5Ø	2ØØ	5ØØ					
6	2X8	FOOT	3.5Ø	2ØØ	7ØØ					
7	NAILS	LB	4.75	5	23.75					
8				------	------					
9				TOTAL$	1748.7					
1Ø	ROOF									
11	------									
12	SHEET	EACH	2Ø.ØØ	5	1ØØ					
13	CLIPS	25	6.ØØ	2	12					
14	NAILS	LB	5.ØØ	1	5					
15				------	------					
16				TOTAL	117					
17										
18			GRAND	TOTAL	1865.7					

Figure 2 (without grid)

HOME EXTENSION

ITEM	UNIT	$EACH	QTY	COST
------	------	------	------	------
FRAME				

3X6	FOOT	3.5Ø	15Ø	525
2X4	FOOT	2.5Ø	2ØØ	5ØØ
2X8	FOOT	3.5Ø	2ØØ	7ØØ
NAILS	LB	4.75	5	23.75
			------	------
			TOTAL$	1748.7
ROOF				

SHEET	EACH	2Ø.ØØ	5	1ØØ
CLIPS	25	6.ØØ	2	12
NAILS	LB	5.ØØ	1	5
			------	------
			TOTAL	117
		GRAND	TOTAL	1865.7

```
Ø GOTO33Ø (C)L.PILZ 1986
1 W$(Z)=Z$:RETURN
2 M=VAL(W$(Z)):RETURN
3 PRINT#J,TAB(A)W$(Z);:RETURN
4 INPUT#J,W$(Z):RETURN
5 PRINT@2,CHR$(E);"<<<<<<";:T=2:
FORZ=V TOV+11:T=T+M:POKES5,E:POK
ES6,E:PRINT@T,W$(Z);STRING$(6-LE
N(W$(Z)),M);"<";:NEXT:RETURN
6 FORX=.TO99:FORA=65TO74:POKES7,
A:FWRITEZ$,FROMZ;W$(X):Z=Z+6:NEX
T:NEXT:RETURN
7 FORX=.TO99:FORA=65TO74:POKES8,
A:FREADZ$,FROMZ,FOR7;W$(X):Z=Z+6
:NEXT:NEXT:RETURN
8 FORX=.TO3:POKEA,X+K:A=A+7:NEXT
:RETURN
9 PRINT@T,RIGHT$(STR$(Z),2);:A=3
:FORX=.TO3:POKES3,X+K+O:GOSUB3:A
=A+7:NEXT:RETURN
1Ø A=A/Q:Z=INT(A):T=INT((A-Z)*Q+
.1):IFT=.THENT=Q:Z=Z-1:RETURNELS
ERETURN
11 Z$=STR$(S):IFS>.THENZ$=RIGHT$
(Z$,LEN(Z$)-1)
12 IFK=.THENRETURNELSEPOKES1,T+O
:GOSUB1:RETURN
13 T$=INKEY$:IFT$=""THEN13ELSET=
ASC(T$):RETURN
14 PRINT" no room":GOTO19
15 PRINT@416,"":PRINT@416,;:PLAY
B$:RETURN
16 PRINT"from ";
17 PRINT"row:";:X=2:GOSUB20:S=VA
L(Z$):IFS<.THENS=.:RETURNELSERET
URN
18 GOSUB15:PRINT"input error"
19 SOUND1,5:GOSUB13:GOTO31
2Ø GOSUB13:IFT=13ORT=12THENRETUR
N
21 IFZ$=""ANDT=8THEN2ØELSEIFT=8T
HENZ$=LEFT$(Z$,LEN(Z$)-1)ELSEZ$=
Z$+T$
22 PRINTT$;:IFLEN(Z$)<X THEN2Ø
23 PLAYB$:GOSUB13:IFT=8THEN21ELS
EIFT<>13ANDT<>12THEN23ELSERETURN
24 PRINT" wait":FORX=1TOF:IFK(X)
=P THENFORZ=X TOF-1:T$(Z)=T$(Z+1
):K(Z)=K(Z+1):NEXT:X=F:F=F-1:NEX
T:RETURN
25 NEXT:FORX=1TON:IFM(X)=P THENF
ORZ=X TON-1:L(Z)=L(Z+1):M(Z)=M(Z
+1):NEXT:X=N:N=N-1:NEXT:RETURN
26 NEXT:FORX=7ØTOY:IFM(X)=P THEN
FORZ=X TOY-1:L(Z)=L(Z+1):M(Z)=M(
Z+1):NEXT:X=Y:Y=Y-1:NEXT:RETURNE
LSENEXT:RETURN
27 PRINT"blank?":GOSUB13:IFT<>89
THEN31
28 GOSUB24:Z=R:POKES1,C+O:GOSUB1
29 IFD>.GOSUB8Ø
3Ø M=32:CLS:GOSUB5Ø:K=1Ø23
31 POKEK+L,62:PRINT@447,""
32 FORZ=1TOF:IFK(Z)=P THENPRINTT
$(Z):Z=F:NEXT:GOTO36ELSENEXT
33 FORX=7ØTOY:IFM(X)=P THENPRINT
"sum from ";CHR$(95);CHR$(L(X)+O
):X=Y:NEXT:GOTO36ELSENEXT
34 FORX=1TON:IFM(X)=P THENPRINT"
sum from ";CHR$(94);L(X):X=N:NEX
T:GOTO36ELSENEXT
35 PRINTSTRING$(M,M);
36 GOSUB15:Z$="":PRINT"ready";
37 GOSUB13:IFT=9ANDC<Q THEN61
38 IFT=8ANDC>1THEN62
39 IFT=94ANDR>.THEN64
4Ø IFT=Q ANDR<99THEN65
41 GOSUB15:IFT=47THEN56
42 IFT=63GOSUB31Ø:GOTO3Ø
43 IFT=43THEN7Ø
44 IFT=93THENZ=.:GOTO21Ø
45 IFT=21THEN337
46 IFT>32ANDT<91THENPRINT"input:
";:X=6:GOSUB21:IFT<>12ANDZ$<>""T
HEN28
47 GOTO36
5Ø 'screen
51 J=.:K=H:T=.:IFW<G THENZ=W:GOS
UB9:K=.ELSEK=O
52 A=1Ø26:K=K+H:GOSUB8:K=H:FORZ=
V TOV+11:T=T+M:GOSUB9:NEXT
53 IFU<G THENT=48Ø:Z=U:K=I:GOSUB
9:A=15Ø6:GOSUB8
54 IFE<65THENRETURNELSE5
55 'command
56 PRINT"command:RiN,pRINt,sTORE
,fLINe,bLrSM,cSM,dCM,FCoL,CyCS,D
Sk,TlInE";
57 GOSUB13:PRINT@448,"":GOSUB15:
S=G
58 ONINSTR("IPTSFEBRCDOYKLN",T$)
GOTO11Ø,13Ø,29Ø,14Ø,21Ø,215,27,2
7Ø,26Ø,28Ø,22Ø,23Ø,24Ø,25Ø,252:G
OTO31
6Ø 'move
61 P=P+1:C=C+1:IFC<H+4THENPOKEK+
L,96:L=L+7:GOTO31ELSEH=H+1:GOTO3
Øright
62 IFE>O ANDC=2 THEN36
63 P=P-1:C=C-1:IFC+1=H ORE>O AND
C=H THENH=H-1:GOTO3ØELSEPOKEK+L,
96:L=L-7:GOTO31left
64 P=P-Q:R=R-1:IFL>65THENPOKEK+L
,96:L=L-M:GOTO31ELSEV=V-1:GOTO3Ø
up
65 P=P+Q:R=R+1:IFL>383THENV=V+1:
GOTO3ØELSEPOKEK+L,96:L=L+M:GOTO3
1down
7Ø 'calc in
71 PRINT"formula:";:IFF=G THEN14
ELSEX=31:GOSUB2Ø
72 IFT=12ORZ$=""THEN31
73 X=.:K=G:T$(X)=Z$:GOSUB83:IFK<
.THEN18
74 GOSUB24:F=F+1
75 T$(F)=Z$:K(F)=P:GOTO29
```

```
80 'calc
81 FORK=1TOD:IFF=.THEN100
82 FORX=1TOF
83 M=(LEN(T$(X))-3)/4
84 T=-3:FORA=1TOM+1:T=T+4
85 Z=VAL(MID$(T$(X),T+1,2)):IFK=.GOSUB124:NEXT:RETURN
86 S=ASC(MID$(T$(X),T,1))-O
87 IFX<1THENIFS<1ORS>Q THENK=-1:NEXT:RETURNELSENEXT:RETURN
88 POKES2,S+O:GOSUB2
89 IFA=1THENJ=M:GOTO98
90 Z$=MID$(T$(X),T-1,1)
91 IFZ$="+"THENJ=J+M
92 IFZ$="-"THENJ=J-M
93 IFZ$="*"THENJ=J*M
94 IFZ$="^"THENJ=J^M
95 IFM=.THENM=1
96 IFZ$="%"THENJ=J/M*G
97 IFZ$="/"THENJ=J/M
98 NEXT:S=FIX(J*B)/B
99 A=K(X):GOSUB10:GOSUB11:NEXT
100 'csum
101 IFN=.THEN105
102 FORX=1TON:S=.:A=M(X):GOSUB10
103 J=Z:FORZ=L(X)TOJ-1
104 POKES2,T+O:GOSUB2:S=S+M:NEXT:GOSUB11:NEXT
105 'rsum
106 IFY=69THEN109
107 FORX=70TOY:S=.:A=M(X):GOSUB10
108 FORA=L(X)TOT-1:POKES2,A+O:GOSUB2:S=S+M:NEXT:GOSUB11:NEXT
109 NEXT:RETURN
110 'rowIN
111 PRINT"insert row?";
112 GOSUB13:IFT<>89THEN31
113 PRINT" wait":M=99
114 IFA$(M)=""ANDB$(M)=""ANDC$(M)=""ANDE$(M)=""ANDF$(M)=""ANDG$(M)=""ANDH$(M)=""ANDI$(M)=""ANDJ$(M)=""THENM=M-1:GOTO114
115 IFM=99THEN14
116 FORX=M TOR STEP-1:Z=X+1
117 A$(Z)=A$(X):B$(Z)=B$(X):C$(Z)=C$(X):D$(Z)=D$(X):E$(Z)=E$(X):F$(Z)=F$(X):G$(Z)=G$(X):H$(Z)=H$(X):I$(Z)=I$(X):J$(Z)=J$(X):NEXT
118 Z=R:Z$="":FORA=1TOQ
119 POKES1,A+O:GOSUB1:NEXT
120 K=.:FORX=1TOF:GOSUB83:IFK(X)>R*Q THENK(X)=K(X)+Q
121 NEXT:FORX=1TON:IFM(X)>R*Q THENM(X)=M(X)+Q
122 NEXT:FORX=70TOY:IFM(X)>R*Q THENM(X)=M(X)+Q
123 NEXT:GOTO29
124 IFR>Z THENRETURNELSES=Z+1:IFS>9GOSUB11ELSEZ$=STR$(S)
125 MID$(T$(X),T+1,2)=Z$:RETURN
130 'printer
131 GOSUB16:IFT=12THEN31
132 PRINT:PRINT"grid?";:GOSUB13:IFT=12THEN31ELSEPRINT" printing"
133 A=4:J=-2:IFP$<>""THENPRINT#J,TAB(A)P$:PRINT#J
134 IFT=89THENFORX=65TO74:PRINT#J,TAB(A)CHR$(X);:A=A+7:NEXT:PRINT#J
135 PRINT#J:FORZ=S TOR:A=4
136 IFT=89THENPRINT#J,RIGHT$(STR$(Z),2);
137 FORX=1TOQ:POKES3,X+O:GOSUB3:A=A+7:NEXT:PRINT#J:NEXT:GOTO31
140 'storage
141 Z$(1)="cSAVE ":Z$(2)="ClOAD     ":Z$(3)="dSAVE ":Z$(4)="DLOaD"
142 FORA=1TO4:PRINTZ$(A);:NEXT:GOSUB13:A=INSTR("CLDA",T$):IFT=12THEN31ELSEIFA=.THEN18
143 GOSUB15:PRINT"action="Z$(A):PRINT"filename:";:X=8:GOSUB20:IFT=12THEN31ELSEIFZ$=""THEN18
147 PRINT" ok?";:IFA<3THENMOTORON:AUDIOON
148 GOSUB13:MOTOROFF:AUDIOOFF:J=-1:IFT<>89THEN31ELSEPRINT" wait";:K=5
149 ONA GOSUB150,160,170,190:CLOSE:GOTO30
150 'csave
151 A=.:OPEN"O",#J,Z$
152 PRINT#J,F,N,Y,P$
153 FORX=1TOF:PRINT#J,T$(X),K(X):NEXT
154 FORX=1TOY:PRINT#J,L(X),M(X):NEXT
155 FORX=1TOQ:FORZ=.TO99
156 POKES3,X+O:GOSUB3:NEXTZ,X:RETURN
160 'cload
161 OPEN"I",#J,Z$
162 INPUT#J,F,N,Y,P$
163 FORX=1TOF:INPUT#J,T$(X),K(X):NEXT
164 FORX=1TOY:INPUT#J,L(X),M(X):NEXT
165 FORX=1TOQ:FORZ=.TO99
166 POKES4,X+O:GOSUB4:NEXTZ,X:RETURN
170 'dsave
171 CREATEZ$,110*G
172 FWRITEZ$,FROM.;F
173 FWRITEZ$,FROMK;N
174 FWRITEZ$,FROMQ;Y
175 FWRITEZ$,FROM15;P$
176 Z=50:FORX=1TOF
177 FWRITEZ$,FROMZ;T$(X)
178 FWRITEZ$,FROMZ+M;K(X)
179 Z=Z+38:NEXT
```

CORRECTION FOR ERRORS SEE

DRAGON USER MAY 87 PAGE 4.

DRAGON USER APRIL 87 PAGE 3.

DRAGON USER · DEC 86 PAGE 4

```
180 Z=G*4Ø:FORX=1TOY
181 FWRITEZ$,FROMZ;L(X)
182 FWRITEZ$,FROMZ+K;M(X)
183 Z=Z+Q:NEXT:Z=G*5Ø:GOTO6
19Ø 'dload
191 FREADZ$,FROM.;F
192 FREADZ$,FROMK;N
193 FREADZ$,FROMQ;Y
194 FREADZ$,FROM15,FOR3Ø;P$
195 Z=5Ø:FORX=1TOF
196 FREADZ$,FROMZ,FORM;T$(X)
197 FREADZ$,FROMZ+M,FORK;K(X)
198 Z=Z+38:NEXT
199 Z=G*4Ø:FORX=1TOY
2ØØ FREADZ$,FROMZ;L(X)
2Ø1 FREADZ$,FROMZ+K,FORK;M(X)
2Ø2 Z=Z+Q:NEXT:Z=G*5Ø:GOTO7
21Ø 'fline/jump
211 GOSUB17:IFT=12THEN31
212 IFZ=.ANDS>88THEN18
213 IFS<G THENPRINT" FROM a,b,c,
d,e,f,g?":GOSUB13:IFT=12THEN31EL
SET=T-O:IFT<1ORT>Q THEN18
215 IFZ=.THENR=S:V=S:L=42:H=T:C=
H+1:P=S*Q+C ELSEU=S:I=T
216 GOTO3Ø
22Ø 'fcol
221 IFC=H THEN18ELSEPRINT"column
 (@=NONE):";:GOSUB13:IFT=12THEN3
1ELSEIFT<O ORT>74THEN18ELSEE=T:G
OTO3Ø
23Ø 'cycles
231 PRINT"cycles:";D;:GOSUB13:IF
T=12THEN31ELSEIFT<48ORT>57THEN18
ELSEPOKE1448,T:D=T-48:PRINT" wai
t":GOTO29
24Ø 'dir
241 PRINT"disk dir?":GOSUB13
242 IFT<>89THEN31ELSECLS:DIR
243 GOSUB13:GOTO3Ø
25Ø 'tline
251 GOSUB17:IFT=12THEN31
252 W=S:GOTO3Ø
26Ø 'csum
261 IFN=69THEN14
262 GOSUB16:IFT=12THEN31
263 IFS>R-2THEN18
264 GOSUB24:N=N+1
265 L(N)=S:M(N)=P:GOTO29
27Ø 'rsum
271 IFY=G THEN14
272 IFC<3THEN18ELSEPRINT"from co
lumn:";:GOSUB13:IFT=12THEN31ELSE
T=T-O:IFT<1ORT>C-2THEN18
273 GOSUB24:Y=Y+1:M(Y)=P:L(Y)=T:
GOTO29
28Ø 'dcm
281 PRINT"decimals:";:GOSUB13
282 T=T-48:IFT<.ORT>4THEN18
283 PRINTT;"wait":B=Q^T:GOTO29
29Ø 'title
291 PRINTP$:PRINT"t:";:X=3Ø:GOSU
B2Ø:IFT<>12THENP$=Z$:GOTO31ELSE3
1
3ØØ 'border
3Ø1 CLS5:FORX=33TO449STEP32
3Ø2 PRINT@X,STRING$(3Ø,175);
3Ø3 IFX=33ORX=449THEN3Ø5
3Ø4 PRINT@X+1,STRING$(28,32);
3Ø5 NEXT:RETURN
31Ø 'summary
311 PLAYB$:GOSUB3ØØ
312 PRINT@1Ø9,"summary";
313 PRINT@167,"ARROWS=CELL MOVE"
;
314 PRINT@196,"S/R ARROW=JUMP MO
VE";
315 PRINT@236,"+=FORMULA";
316 PRINT@268,"/=COMMANDS";
317 PRINT@296,"CLEAR=ABORT";
319 PRINT@324,"S/L ARROW=FIRST C
ELL      ";
32Ø PRINT@364,"?=SUMMARY";
321 PRINT@435,"press a key";
322 GOSUB13:PLAYB$:RETURN
33Ø 'intro
331 PCLEAR1:CLEAR1ØØØØ:GOSUB3ØØ:
POKE329,1:D=1:Y=69:Q=1Ø:G=1ØØ:B=
G:U=G:W=G:O=64:B$="T1ØØO5B"
332 PRINT@172,"analyzer";
333 PRINT@324,"COPYRIGHT (C)L.PI
LZ 1986";:FORX=1TO5:PLAY"T15O=X;
CEGEGB":NEXT:SOUND24Ø,1
334 S=PEEK(25)*256+PEEK(26)
335 S1=S+29:S2=S+49:S3=S+69:S4=S
+86:S5=S+155:S6=S+169:S7=S+222:S
8=S+277
336 GOSUB312:DIMA$(G),B$(G),C$(G
),D$(G),E$(G),F$(G),G$(G),H$(G),
I$(G),J$(G),T$(G),K(G),L(G),M(G)
337 L=42:H=1:P=2:C=2:R=.:V=.:GOT
O3Ø

END

4ØØ ' TEMPORARY LINES
41Ø S=PEEK(25)*256+PEEK(26)
42Ø FORX=S TOS+3ØØ
43Ø PRINTX-S,PEEK(X)
44Ø NEXT
```

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DR15

GROSVENOR SOFTWARE

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ANSWER: Major disk corruptions are common with CumanDOS. SuperDOS closes files and disks correctly. You can safely change disks after CLOSE or whenever Basic's OK appears.
PROBLEM: CumanaDOS — I can't get a file update program to work. I update a record, and the next time I look it gives me the old data again.
ANSWER: I'm not surprised — it's almost impossible in CumanaDOS because of serious bugs. Fit a SuperDOS chip in your 1.2 / 2.0 contoller.
PROBLEM: DragonDOS — I keep getting NR error — especially in BACKUP.
ANSWER: SuperDOS ensures the motor is up to speed before reading.

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ALLDREAM — DSKDREAM — DRS filing system — all available, see last month.

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DR18

If you've got a technical question write to Brian Cadge. Please do not send a SAE as Brian cannot guarantee to answer individual inquiries.

Dragon Answers

Line jump

IN ORDER to speed up a Basic program, I wish to replace several IF...THEN lines with a machine code routine. After the machine code has made the comparisons, is there any way to direct the return to Basic to a different line number other than the one which follows the EXEC command?

Derek Probyn
6 Emberton Street
Chesterton, Staffs
ST5 7LJ

IF YOU use the machine code program listed below, this will allow you to call your routine as follows:

EXEC addr, line

Where 'addr' is the address of the routine, and 'line' is the line number to jump to if the machine code test is successful. If it is not, then the program continues as normal.

```
START JSR 35242 *Skip over
comma
*
*Insert your code here...
TSTA *Check result status
LBNE $85D7 *Execute GOTO
JSR 36483 *Skip line number
RTS
```

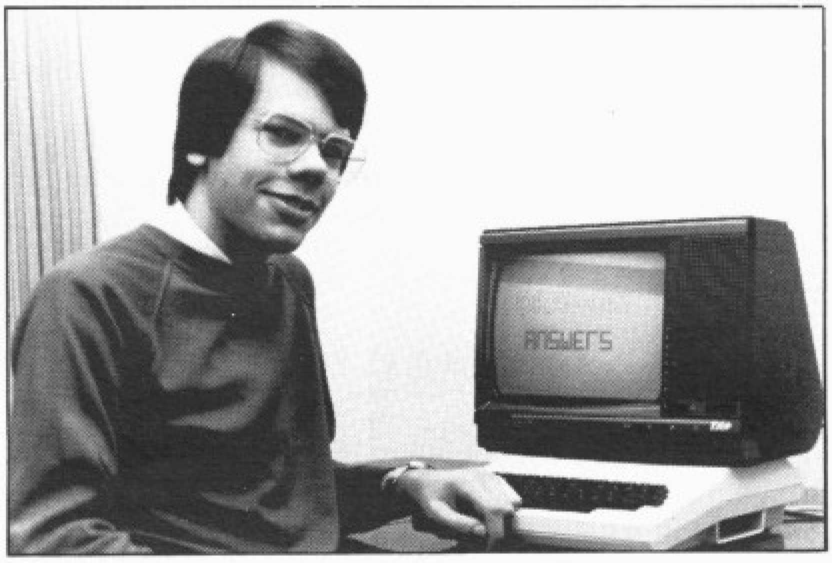
DOS help

IN THE August edition of Dragon User you published a query from Mr. McCandish about using DeltaDOS ROM routines. I have a copy of the 'DeltaDOS Advanced Programmer's Guide' which gives a lot of help and information about particular DOS routines and a friend of mine has disassembled the Delta ROM and gone through it putting in comments on sections of code.

If you would publish my name and address in your column I would be happy to help anyone with DeltaDOS queries.

Gary Coxhead
54 The Sorrells
Corringham
Stanford Le Hope
Essex SS17 7DS

OUR thanks to Gary for his offer of help. If you do write to him then please enclose an SAE if you want a reply!



No RAM

USING THE Alldream assembler (on tape) and attempting to assemble at an ORG of $C000 results in an error. I assume this is because it is not RAM. Is there any way to assemble directly to these addresses to provide correct source code for EPROMs?

D. P. Follett
54 Kenilworth Road
Fleet, Hants

YOU ARE correct in assuming the problem is caused by there being no RAM at $C000. If you run Alldream with RAM fitted here then it will happily assemble direct to this area.

The solution is to use the PUYT assembler directive to place the binary code elsewhere in RAM, while still generating code which is correct to run at $C000. For example, to store it in the graphics area use:

```
ORG $C000
PUT 3072
```

BIN files

I WOULD like to know how to load and save standard binary (.BIN) files to and from disc from machine code. Is there any chance of an article on DragonDOS appearing in Dragon User?

Trevor Peacock
7 Hill Farm Way
Southwick, Sussex
BN4 4YJ

IF YOU want to make your machine code program compatible with all the versions of DragonDOS then you should use the standard DOS routines (open/close/read/write file etc.) rather than jump into the ROM in the middle of the SAVE and LOAD Basic commands.

All the information you need is contained in 'A Programmer's Guide To DragonDOS' available from Grosvenor Software, 22 Grosvenor Road, Seaford, E. Sussex BN2 2BS, for £2.90 including post and packing.

'Gapped'

I WOULD like to know what a 'gapped file' is and how I can use it to place machine code being loaded from cassette into different places in memory.

Paul Burgin
18 Moorcroft Road
Sheffield, S10 4GS

WHAT IS normally referred to as a 'gapped file' is that produced for ASCII data on the Dragon. All files are made up of blocks of data 255 bytes long, but unlike Basic and machine code, ASCII files have 'gap' of about 1.5 seconds between each block to allow the computer to stop and start the tape while reading in the data.

The length of blank tape between the blocks is technically known as the 'inter-block gap'. Binary files normally have a zero length inter-block gap so it is hard to see how you could use gapped files to load in machine code.

To load code at a different address to that which it was saved from you simply need to give CLOADM a (2's complement) offset, eg CLOADM "FILE", 1000 will load FILE at 1000 bytes higher than it was saved from.

Kung-fu

I RECENTLY saw a game called 'Way of the Exploding Fist' on a friend's Spectrum. Is this game available for the Dragon 32 and if so where can I get it?

Nigel Cobb
245 Coston Road
Sheffield 18

'EXPLODING FIST' is produced by Melbourne House but there is no Dragon version available. A couple of kung-fu games available for the Dragon which are worth considering are 'The Master' from Blaby Games at £5 and 'Shaolin Master Plus' from Quickbeam Software at £8, this is superior to the Spectrum version of 'Fist' in my opinion. Blaby can be contacted at Crossways House, Lutterworth Road, Blaby, Leicester and Quickbeam at 67 Old Nazeing Road, Broxbourne, Herts.

Addresses

COULD YOU please tell me how it is possible to find the start, end of offset addresses of commercial machine code programs so that I can make backup copies of them to tape. I would be very grateful if you could help me with this problem.

Martin Ellis
67 Cooper Road
Matlesham Heath
Ipswich

FOR STANDARD binary tape files the following locations can be peeked after loading the file:

START: 487/488 LENGTH+1: 126/127 ENTRY: 485/486

Most commercial programs use one form of protection or another so it is rarely simple to find the addresses for them. You shouldn't need to copy commercial tapes, and of course passing a copy on to anyone else is illegal and you could end up facing a very hefty fine if you do.

Expert's Arcade Arena

Write to 'The Expert' at Dragon User 12-13 Little Newport St, London WC2H 7PP. with all your arcade tips and hints.

AND SO once again time ebbs its slow way forward *((That's one of the worst mixed metaphors I've ever seen — Ed.))* towards the moment at which time will do something totally unexpected. 'So what will happen at this moment?' you ask and scratch your heads. I shall tell you. The date will be the publication date of the next issue of Dragon User, and the event is my Christmas present to you all, an alphabetical list of millions of pokes (and that means at least twelve or thirteen)! Yes, I can PERSONALLY GUARANTEE that if the poke you want is not there next month, then either it doesn't exist, or I don't think it's any good, or you will be very irritated!

But 'What do you have for us this month?' you cry. Well, mere mortals, I can present a lot of good thingys for you this month. For starters, you may have noticed the map ... Yes, Mike Gerrard, this is WAR! Here is a *Juxtaposition* map, and a very, very good one, by David Barclay, who also writes a sob story. David you may remember was the winner of our mystery picture competition and he won a free subscription, well, the very funny thing is that he sent a cheque for one with his competition entry, the very very funny thing is that he's been receiving two copies, and the very very very funny thing is that he's asked me, the Expert, to do something about it. Well, I'm going to have a jolly good laugh at your expense, that's what I'm going to do. Ha ha ha hee hee hee ho ho ho bloody ho biddly bom hee hee (etc.). Right, that'll do. Hopefully the subscription office will be moved and they'll sort you out, David. *(Drop us a line, preferably enclosing your unwanted July issue, David, and we'll see if we can arrange something. Ed.)*

If anyone else has problems of an administrative nature, don't hesitate to send them to someone else. I do the pokes, not the paperwork.

I've had a very interesting letter from The Man Who Couldn't Type (I warn you — pretentious pen names can screw you up. They certainly will if I get my hands on you.) who kindly provides a new competition. All you have to do is match the message to the location (they're the messages that come up after you've done 4D on each screen) from the list below and you can win a wonderful prize which I haven't thought of yet, but it's sure to be utterly worthless. To help you all I've done the first twenty one of them, so you only have to match the code message to the location for the rest of them.

Location Message

Death Valley — A real desert rat!
Outlaw Alley — Smile while you say it!
Lost Maverick Mine — Buy low, sell high!
Dodge City Bank — Bandit busts bank!
Dead Man's Pass — Go for it!
New River Crossing — Grab the gusto!
Tombstone Jail — It's good to be free!
Castle Greymoon — I dub thee — Knight!
Halls of Doom — You made it!
Black Dungeon — Bree yark! Bree yark!
Mystery Maze — You can't escape!
Underworld Arena — Well done, Gladiator!
Forgotten Ruins — Good show, Ranger!
Chaos Caverns — Crush kill destroy!
Gamma Station — Eno siht daer!
Hyperspace — Warp 12 or death!
Escape to Moonbase — Shuttle docked!
The Insidious Grid — Beware grid bugs!
Enterprise — Spock lives!
Starship Omega — Beam me up!
Light barriers — Use the force!

So, there's the competition. I hope you don't think it's too difficult. Well, here's a little cheat to help you. Follow the instructions:

First load the game with audio on, wait until the game has loaded EXCEPT for the very last block (which is only about a second long, so find out where it is beforehand and mark it with the tape counter), press reset (the machine will apparently cold-start), type the following pokes in carefully:
POKE 13623, &H7E : POKE 13624, &H2E :
POKE 13625, &HE1 : POKE 12001, &HB7 :
POKE 12002, &2HE : POKE 12003, &HE0 :
POKE 12004, &H86 : POKE 12005, &H64 :
POKE 12006, &HB7 : POKE 12007, 0 :
POKE 12008, &H41 : POKE 12009, &HB6 :
POKE 12010, &H2E : POKE 12011, &HE0 :
POKE 12012, &H7E : POKE 12013, &H35 :
POKE 12014, &H3A.

Save the game using CSAVEM "BANDIT", &H3000, 32755, &H3000. From now on the game should be loaded by typing CLOADM:EXEC (ENTER) and when you play your power will be set back up to 100 for every hundred points you score! My final selection from this man's funny and interesting letter is his choice of 'Music to Zap To'. This month's nomination is (fanfare) *The Broadsword and the Beast* by Jethro Tull ... (No, I've never heard of them either, Eric.)

And now for *Keys of Roth*. I've not got a copy of this, so if anyone wants to post me one, I'd be most grateful. However, not one to withhold information, here's the solution, courtesy of Edward Brown who hails from Leicester. Take it away Eddie baby!

"A) First you must Edit line 26. Where it says "ST=Q2" change it to "ST=50". (Hey, is this a solution or a hack? Oh stuff it, who gives a damn anyway.)

B) Whenever you come across a jam butty, ignore it.

(F) Flag down — Kick or bang door — Go right — Pick up sandal — Go up — Pick up gold — Bang on side — Go left — Go up — Fight monsters — Pick up trumpet — Ignore spade — Go up — Bang on side — Go left — Go down — Go north — (Play) Trumpet — Pick up Diamonds — Drop cheese if need to (No. 3) — Wade across (ignore them) — Leave them — Kill monsters — Kick door — (thrown in sandals) — THE KEYS!"

Seems pretty easy, sounds a bit like an adventure. I'm not too keen to have Mike Gerrard round accusing me of invading in the Wee Small Hours. Mike is a big guy, he makes Cobra look like Glow Worm.

Now then, to the *Total Eclipse* Save-game Editor of oh so many months ago, there were some bugs in it according to Matthew Lodge from Cheshire:

Line 400 should ready "400 IF -AN THEN 80 ELSE 260"

Line 1400 should read "1400 DATA CARGO HOLD, 5, FUELTANK, 5, 10, MQ LASER, 7, HYPERDRIVE, 1, DRILLING KIT, 1, ASTEROID DRILL, 1, WELLCAP, 9"

Also EXPLOSIVES is spelt wrongly in line 1390, and the line number (which should be 10) is missing from the first line. Matthew has also given a couple of suggestions as to who I am, ie definitely not 'Orbaum of the Warped Mind', not Mike Gerrard, and I am not even a Dragon running some state of the art AI program (well, that's certiandlkjalenludalalOERROR, sorry certainly true) So I must be a) I am most of the rest of the UK b) Lord Lucan c) Terry Wogan. Well, Matt, all I can say is, 'Close, but no banana'. You don't even get this month's prize, which goes to Christopher Greenback, who suggests that I might be 'the p****d off gorilla on the Tom Mix title screens'. Wrong, but very amusing. Chris's prize is to see his name, and all the information he sent me, IN THIS COLUMN. And I think you'll be quite interested too ...

'Dear Expert, In your informative columns you have mainly included pokes to make games easier to play' — For those lesser mortals who find them hard, Chris, I, for myself, need them not — 'Why not include pokes that allow you to customise games?'

'Chuckie Egg by A+F Software was a very good game until the games started lasting hours' — only hours? The kid's an amateur! — 'because the screens were memorised. Below are details of how the screens are stored so that new ones can be produced.'

Addresses Contents

3C00 3C01 Hi and lo byte of start screen 1
3C02 3C03 Hi and lo byte of start screen 2
3C0E 3C0F Hi and lo byte of start screen 3

'Screen data can be stored between $3C10 and $40FF. I have not tried but I think it could also be stored after the program which is at $4110.

Each of the eight blocks of screen data is ordered in the sequence shown below:

A) A 'header' of five bytes containing 1) number of walls in screen 2) number of ladders in screen 3) 'X' co-ordinate of lift (0 if no lift) 4) number of seeds in screen 5) initial number of chicks in screen.

B) The five co-ordinates of the chicks. These are in the order Y, X, and are the normal 256 by 192 with X having to be an even number and Y being a multiple of eight (so that it can walk on a wall).

C) The wall co-ordinates which are Y, X, of the left corner and the length. The X, Y, Length are worked out on a character grid of the screen which numbers from 0 to 31 along the X axis and 5 to 23 on the Y axis going across and down respectively from the top left hand corner. For the wall co-ordinates there will be three bytes multiplied by the number of walls.

D) The ladder co-ordinates which are X,

Y, of the top left corner, and length, these also use the character positions, and there are three bytes multiplied by the number of ladders.

E) The egg co-ordinates which are Y, X, using the character positions. There are always twelve eggs and therefore 24 bytes in this section.

F) The seed co-rodinates which are X, Y using the character positions. There are two bytes times the number of seed in the screen.

The man always starts at (12, 22) and (13, 22).'

So, there's Chris's *Chuckie Egg* designer, and that's about it for this month, except to say, keep sending the pokes, keep sending the maps, keep sending the screen designers, keep sending the suggestions of who or what I am, keep sending the fivers.



NEW PRODUCT: — PI-6809

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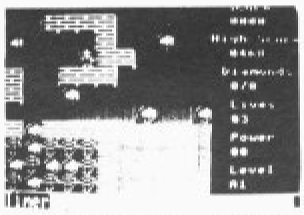
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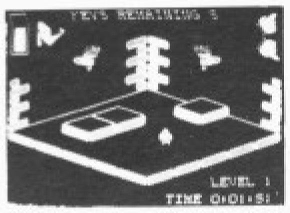
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AS THE number of Dragon adventures released by the main software houses dries to a trickle, you readers have shown that you're not going to take it lying down and have been increasingly writing your own and sending them to me. I'm happy to look at any I receive, and even review them in the column if I think they're worth it, though some submissions have had to be returned to their authors as not really being up to scratch.

For the benefit of anyone thinking of sending something in, let me tell you what I mean by that. It's not that I'm a particularly hard person to please, and I do recognise the amount of hard work and hours of slog that go into the production of any piece of software, especially an adventure — I know because I've done it! In some cases I'll say that I can't review the adventure because I don't think it will have a wide enough appeal to all the *Dragon User* readers who take a stroll down the *Adventure Trail* each month. An adventure set in your own school might be funny to yourself and your friends, for example, but won't mean much to anyone else, particularly if solving the problems relies on a knowledge of some of your teachers' peculiar habits.

In some cases I may even send one back without spending more than about five minutes looking at it. That happens when I find very obvious bugs in the first few locations, along with lots of spelling mistakes. Send something in that's shoddy and you'll get it back pretty sharpish! I've always got a million and three things to do, and debugging other people's adventures isn't one of them. Send something in that's promising, though, and you'll get what I hope will be constructive criticism.

First-rate

Reader Rob Margrave sent me in a two-part adventure called *Fernando Poo*, and apart from not being too keen on the title I thought it was simply the best adventure I'd ever seen from a reader by far. The screen lay-out was excellent, the storyline original, problems were intriguing and sensible, response was quick and there were lots of nice touches such as a KEEP command, which allowed you to save your position to memory. I'm sure Rob would have had no trouble in interesting a software house in his adventure when the Dragon scene was flourishing, and he's still having a go at doing that, but will publish it himself if no-one else will take it on. I'll save a full review for when the game's future is decided and I can tell you where to buy it, but if any software house is keen to get its hands on a first-rate adventure, contact Rob Margrave at 24 Canon Young Road, Whitnash, Leamington Spa, Warwickshire CV31 2QU.

Another regular reader is Lionel Depeux, whose name has appeared before in these hallowed pages, and he's written an adventure purely to amuse himself and a friend of his. It's a crazy tale based loosely around the works of Lewis Carroll, and a good knowledge of those is necessary to enable you to solve the game. The main interest here, though, is in the programming. Again the screen lay-out is very well done, and Lionel has seen to it that every line of the lengthy and atmospheric location descriptions fits exactly onto the 32-character screen. They are also done in inverse video, which looks effective, and there are various machine code routines incorporated to read and analyse the input and also protect the program. Lionel isn't putting the adventure up for sale, but anyone who's keen on the programming of adventures is welcome to contact him at 5 rue Henri Martin, 92600 Asnieres, France.

By far the most prolific of my adventure-writing readers is Michael Edwards, alias Broomsoft, and I've received no less than three of his titles recently. Thankfully they're always worth looking at, and also worth buying at only £4 from Broomsoft at 30 Broomhills, Welwyn Garden, Herts AL7 1RF. Michael must spend more time writing adventures than he does actually breathing, and I've already mentioned the first two parts of his *Space Trek* series, and now he's come up with *Space Trek III*. This follows the format of the others in allowing you to control four different characters, the co-operation of each will be necessary to solve the adventure as certain tasks can only be done by certain characters — well, there's an engineer and a doctor among them, so start to work it out from there.

This time a dimensional gate has been opened, which is more serious than opening a five-bar gate on a field full of cows as it causes the Starship Endeavour to be sucked through into another dimension. How to get back? You're looking for the missing quarter of the Quadre-key, which will do the trick. The game begins rather boringly in that you have to move all four characters from the first location to another one that's six moves away, picking up a few clues and objects on the way, before blasting off in the shuttlecraft to a place called Mishma, where you come down on a landing pad that's not far from where the problems really begin, in forests and up icy cold mountains. A nuisance is that there are sudden death routines, and you can't SAVE your position unless you QUIT first, then re-RUN the adventure and LOAD your saved game. Michael ought to get rid of these unexpected and unannounced deaths, and also tidy up the endings, and this isn't the best of his three latest titles.

An improvement is *The Time Machine Search*, in which you've just completed and are testing a Time Machine when there's a loud explosion and you wake up in a different world. The machine has broken up into its four main pieces, and you know you'll have to find them all before you can return. The bad news is that they are all automatically camouflaged so will blend in with the surroundings wherever they happen to have ended up, but the good news is that the watch which you have surgically implanted in your wrist will buzz when a piece is nearby.

Poison mist

The land where you are doesn't at first seem all that different from earth: a road, a shed, a school, a pub with a dartboard and even a gloomy looking barman. But why is there a poison mist when you get through the school fence, and what's this strange old warehouse containing lots of crates with unusual and useful objects? One crate even contains the Ark of the Covenant, but maybe that's just strayed in from another adventurous tale. There are some seeds that can be planted to produce a tree just beckoning you to climb up it, while in the school there's an operating sprinkler system, a robotic basketball player and a pool with a plug and a trapdoor — the problem is that you drown before you can get to either. In fact the school is overflowing with items: a magnet, acid, knife, plate, crowbar, matches, basketball, net, umbrella, tank of water, valve, frames. Too many to carry round, and a lot of mapping...and I haven't figured out what to do with the barman yet.

And even better is *Dream Machine*, which has optional instructions like the others, but also a brief introduction to adventure games for beginners. Once again there's been a warp in space (where would Broomsoft be without them!), and you're in a dimly-lit laboratory where there's a large machine. From nowhere a face appears, suspended in mid-air, and it asks for your help, claiming to have been caught by a devil. 'Use my dream machine and rescue me,' it says, before being replaced by a sinister horned figure which tells you that if you want the professor back then you must return with a salamander, a minotaur, a basilisk and a golem.

That's the kind of scenario that makes me

want to play on! After exploring the Victorian house where the Dream Machine is located, I pressed an operating button and found myself in a chemists, manned by a fat shopkeeper. Another few locations around here and you can find some batteries for the remote control device you also find in the laboratory at the start. Pressing this I was whooshed to the fires of Khan, wherein I was pleased to find a salamander. Good, I thought, and typed SCORE but I still had 0%. Transporting myself again I discovered why, as I was whisked to the Black Desert where the intense cold causes the salamander to vanish. Never mind, I can now hear basilisks in the distance...coming nearer...almost here...yes, they've arrived. And one of them's killed me. Charming.

The screen display on this one needs a bit more work, as the command you enter is for some reason printed out again after the next location description comes up. There are a few small faults, too, like the blaring radio which is still blaring even when you've removed its batteries. I like the way the inventory is laid out, however, with everything separated by a comma except the last two items which always have 'and' between them. Even the likes of Adventure International have trouble getting that right!

This round-up of home-grown adventures means that some of your letters will have to be held over, but there's room for a few quickies. Anyone know how to get past the huge puppy in Franklin in Wonderland? If so, contact Carl Truett, 11 Hayden Rd, Rushden, Northants NN10 OHX. The exact words to board the bus in The Cricklewood Incident? Send to John Haining, Arranview, Somerville St, Catrine, Ayrshire, Scotland KA5 6SQ. Anyone know of any Dragon clubs in Scotland? If so, tell John Spein, 62 Viewpark Drive, Burnside, Glasgow G73 3QQ. Adventuring pen-pal wanted by Simon Avery, 216 Barton Hill Rd, Torquay, S.Devon

Back to the hints and tips next month, and apologies if your letter hasn't been included yet. Maybe if our readers can get back to playing adventures instead of writing them, I can resume normal service!

Adventure Contact

To help puzzled adventurers further, we are instituting an Adventure Helpline — simply fill in the coupon below, stating the name of the adventure, your problem and your name and address, and send it to Dragon User Adventure Help-line, 12/13 Little Newport Street, London WC2H 7PP. As soon as enough entries have arrived, we will start printing them in the magazine.

Don't worry — you'll still have Adventure Trial to write to as well!

Adventure ....

Problem ....

....

Name ....

Address ....

....

Adventure Contact

Adventure Juxtaposition
Problem Where is the transmat receiver and sender unit, and how do you get them when you find them?
Name Richard Tyler
Address 11 Madeira Park, Tunbridge Wells, Kent TN2 5SX.

Adventure El Diablero
Problem Everything!
Name Mark Johnson
Address 3 James Street, Rotherham, South Yorks, England.

Adventure Ten Little Indians by Channel Eight Software
Problem I have the spanner, matches, brass key, candle, coil of rope at the Gatehouse and the Gamekeeper keeps shooting at me **Help!**
Name Esther Duncan
Address 5 Montrose Drive, Garthdee, Aberdeen, Scotland AB1 7DA.

Adventure Juxtaposition
Problem How do you get out of the first building without being shot by the first driod?
Name Oren Yaari
Address Remba 12 St Ramatgan 52587 Israel.

Adventure Demon Knight
Problem How do I get out of the throne room?
Name Alex Edwards
Address 5 Cumber land Villas, Milton Road, Gravesend, Kent DA12 2PQ.

Adventure Trekboer
Problem I don't know how to use the teleport
Name Neil Farquharson
Address 1 Ravenswood Rise, Dedridge, Livingston, West Lothian EH54 6PE.

Adventure Sea Quest
Problem Where is the key for the trapdoor in the beach house? If it is on the mermaid how do I get it?
Name Celvin Curbs
Address 5 Worcester Road, Bangor-on-Dee, Wrexham, Clwyd, North Wales LL13 0JB.

Adventure Pyramid of Doom
Problem Cannot enter the Pyramid — the nomad keeps killing me. I have a full canteen, lantern, shovel, tiny key, stone and I have found a tiny door.
Name Esther Duncan
Address 5 Montrose Drive, Garthdee, Aberdeen, Scotland AB1 7DA.

Adventure Pettigrews Diary Savage Island Part 1.
Problem Can ayone tell me the connection between the diary and the book titles too.
Name Phil.
Address 526 Hawthorne Rd, Bootle, Merseyside L20 6JY.

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HERE'S MY CLASSIFIED AD.
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Winning dice

***Gordon Lee** bakes three million needles into a pi*

George Louis Leclerc, Count de Buffon, apart from being another mathematician with a memorable name, is probably best remembered for the following theorem:

A plane surface is ruled by equally spaced parallel lines, h units apart. A needle of length 1 units is dropped at random onto the surface. The needle will fall and come to rest either crossing one of the lines, or it will lie between them. The probability of it touching a line will be 21/h(pi).

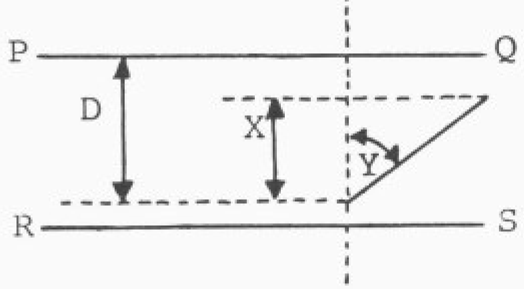
This example of an unusual and unexpected appearance of the enigmatic value of pi is known as Buffon's needle theorem, and was just one of the experiments carried out by Buffon in the field of probability theory.

The above equation can be further simplified if the distance between the parallel lines is made equal to the length of the needle itself, in which case the probability becomes 2/(pi), or approximately 0.6366197.... By 'turning the experiment on its head' as it were, this provides a method, albeit uncertain in outcome, of determining the value of pi by an experimental means. Thus pi should be given by twice the number of times the experiment was performed divided by the number of times the needle came to rest touching a line. This experiment has since been carried out on many occasions. In the mid 19th century Smith and Wolf performed 3,200 and 5,000 drops of the needle respectively. This latter experiment would have taken at least seven hours to complete! Fortunately, we can now dulicate the experiment and carry it out by computer in a fraction of the time that it took these early experimenters.

One other experimenter was the Italian mathematician Lazzarini who, in 1901, claimed an accuracy of 3.1415929 for pi after making 3,408 tosses of the needle. This claim must be regarded with a certain suspicion since, at best, the number of tosses stated could only provide an accuracy of three decimal places. To obtain the result stated at least three million drops would have been needed, and then such an accuracy could not be guaranteed.

```
 10 PRINT "Press a key to begin"
 20 A$=INKEY$:X=RND(0):IF A$="
    "THEN 20
 30 CLS:T=1
 40 WIN=0:FOR DROP=1 TO 5000
 50 D=RND(0):Y=RND(360)-1
 60 X=COS(Y/57.2957795)
 70 IF X<0 THEN 100
 80 IF X>D THEN WIN=WIN+1
 90 GOTO 110
100 IF D+ABS(X)>=1 THEN WIN=WIN+1
110 NEXT DROP
120 PRINT "TEST ";T;" WIN ";WIN;"
    PI=";10000/WIN
130 T=T+1:GOTO 40
```

The following listing imitates Wolf's experiment by running a series of blocks each comprising 5,000 drops. Th program takes the length of the needle and the spacing of the lines as both being unity. A random number between zero and one determines the distance from line PQ of one end of the needle (D). Its rotation in degrees is also taken at random. The cosine of this angle (converted first to radians) gives the vertical displacement between the ends of the needle. Note that a negative value for the cosine indicates an angle of rotation of between 90 and 270 degrees. In this case the needle points towards line RS, and so its displacement distance has to be added to distance D to determine if the needle reaches line RS.



By running the program we can perform the experiment in as many minutes as Wolf probably took hours. However, with only 5,000 throws per block the best we can hope to achieve is a value for pi of 3.1416902 ..., a result which the author obtained on the thirty-seventh test!

This method of problem solving in which random sampling is used is called 'simulation'. This month's competition is to devise a program to find, by simulation, the expected probability of success at the following game which is played with six dice.

The object is to end with all six dice showing the same value, under the following rules:

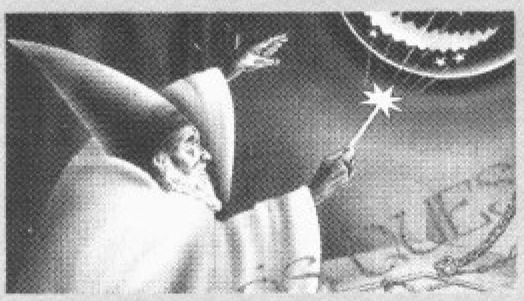
a) All six dice are first thrown.

b) Selected dice may be rethrown up to a maximum of a further five throws.

c) At each throw (after the first) the player need only throw the dice of his choice, leaving the rest on the table.

d) The full six throws need not all be taken if the game is won in fewer throws.

Can you estimate how many games, out of a thousand played, you would expect to win? Clearly, the actual number will vary, as is always the case with simulations, but entrants should include a print-out or copy of their program, with full notes. In playing the game, the player must play to his best advantage. For example, if he has a 'leading value', showing on two or more dice then he would obviously only throw the remainder to try to improve on the score. There is nothing to prevent him from changing this value if a better one is thrown subsequently. If two equal 'leading values' occur a free choice would be made.



Prize

Twenty copies of Microdeal's Christmas cracker Wizard's Quest are lined up for the most elegant and convincing simulations of this dice game. Complete the quest or calculate the quiz, one way or another you'll be a Wiz.

Rules

Just to prove that your calculations were done on your Dragon and not on your fingers and toes, accompany your answer with a printout (or a copy) of the program you used to work it out, and any footnotes on the program which you wish to include. Remember we award for elegance and please don't send any cassettes. Mark your envelope NOVEMBER COMPETITION, and please include your name and address!

Tiebreaker? Any short poem with at least one convincing rhyme for 'Microdeal' in it. Makes programming look simple, eh?

August winners

Total Eclipse has proved pretty elusive, but we know where at least twenty copies are, and they're on their way to: F. Moreton of Kirby, Mike Hides of Sheffield, CFN Heaps of Arborfield, C. Hitchinson of Middlesbrough, D. J. Gray of Middlesborough (no relation), Howard Davies of Cheltenham, E. A. Newman of Addlestone, Phil Sapiro of Liverpool, M.C.Gleave of Sheffield, D. Turner of Cardiff, Douglas Moutrie of Gillingham, B. Davis of Manchester, S.A.Siddiqui of Chiswick, M. Vango of Banbury, M.J. Smith of Bristol, Micahel Graham of Bangor, Nati Korn of Israel, Mark Craven of Lincoln and J. Hewitt of Hixon. Best tie-breaker was Mr. Moutrie's:

'You're never alone in the universe
  While your system transmission is synchronerse
  But a bug in the poke
  Is a terminal joke
  And the Dread-ed power failure is even werse'.

Solution

'Dragon' equals 215348 and 'User' equals 7691. Dragon/User will equal 28, which is 21952 when cubed - only one English word results from this equation, which is 'Dread'.

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